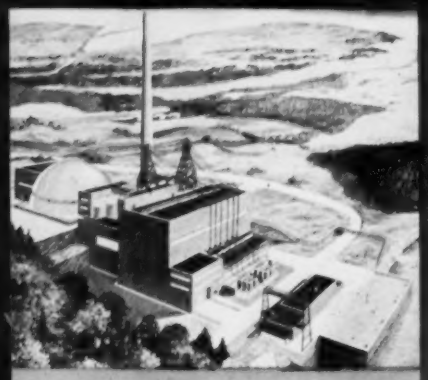

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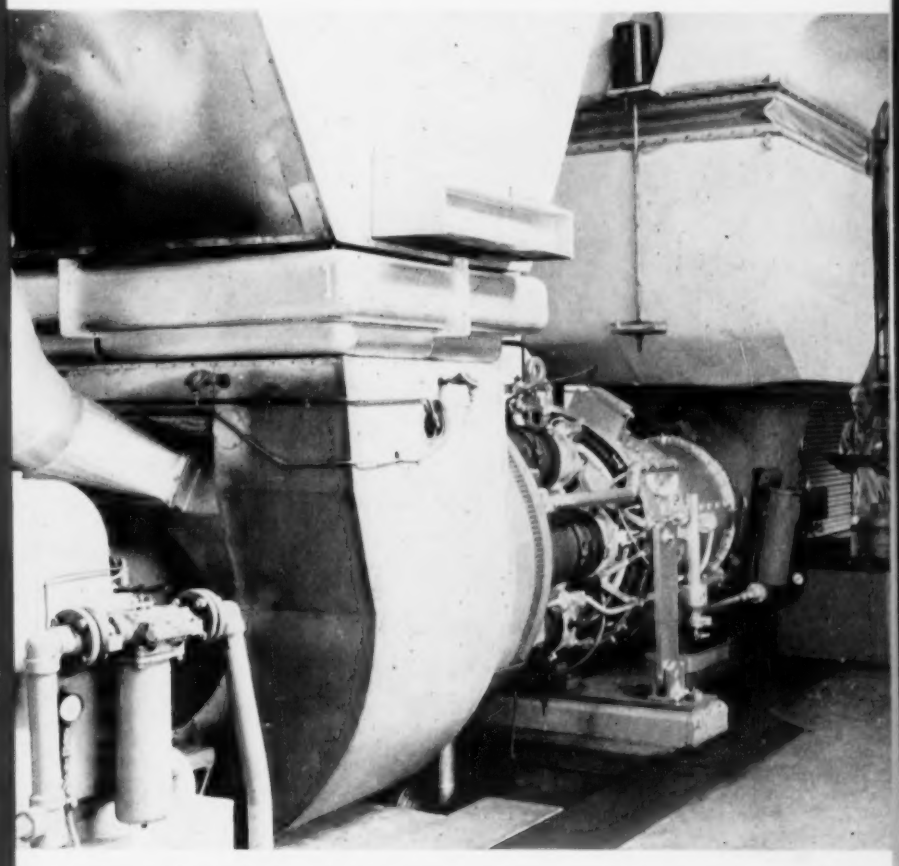
ELECTRICAL WEST

October 1957
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.



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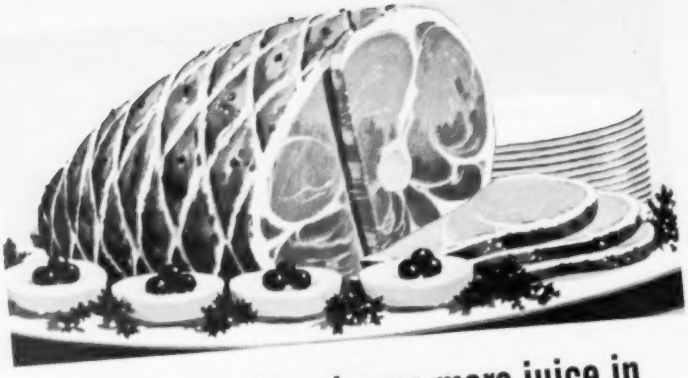
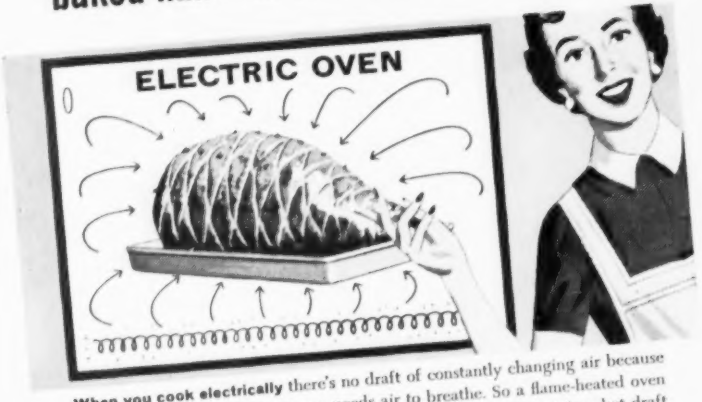


Electric cooking keeps more juice in baked ham—*because it's flameless!*



When you cook electrically there's no draft of constantly changing air because there's no flame. (Flame, you see, needs air to breathe. So a flame-heated oven constantly inhales dry air, exhales moist air—literally cooks meat in a hot draft that evaporates good juices.) In an electric oven there's no draft of dry air. You cook with moist heat. As a result, more juice stays in the meat...and the meat tastes better.

Electric cooking is far cooler, too. As much as 16° cooler. The reason is obvious: electric cooking puts the heat directly into the food, not into the room. Electric cooking is cleaner, too, because it's flameless. There are no by-products of combustion to dirty walls and darken your bright pans. Truly, it's the *only modern way* to cook. Why not see your appliance dealer for a demonstration of the new electric ranges?

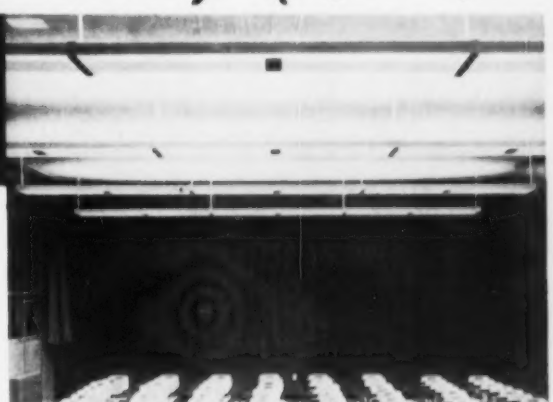
SOUTHERN CALIFORNIA Edison COMPANY

LIVE BETTER—ELECTRICALLY!

Did you know? Flameless electric cooking costs about $1.50 a month for a family of 4

Edison
is selling the
advantages
of electric cooking—
to boost your
electric range
sales

LEADING LIGHTS IN ANY SCHOOLROOM



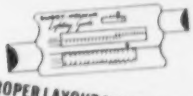
PERFECT VISION Luminaires

SMOOT-HOLMAN *Perfect Vision* Luminaires give maximum fluorescent tube brightness *without glare*. Their sight-saving quality plus low installed cost makes these SMOOT-HOLMAN fixtures tops in "Light" and "Value" for your next school lighting job.

"IT COSTS NO MORE TO GET THE BEST IN MANY WAYS THE COST IS LESS"

SMOOT-HOLMAN

tomorrow's lighting today INGLEWOOD, CALIFORNIA



PROPER LAYOUT MADE EASIER!

Send for your free SMOOT-HOLMAN "Lighting Guide"... an auto-calculator to compute the required lamps and fixtures for any room...for any lighting job!

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

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Next Month

We will carry a series of articles by young engineers, covering challenging experiences in computer studies, transmission design and atomic studies. These articles will be reprinted in a brochure and made available to college students so that they may take an honest look at challenges in the field of utility engineering.

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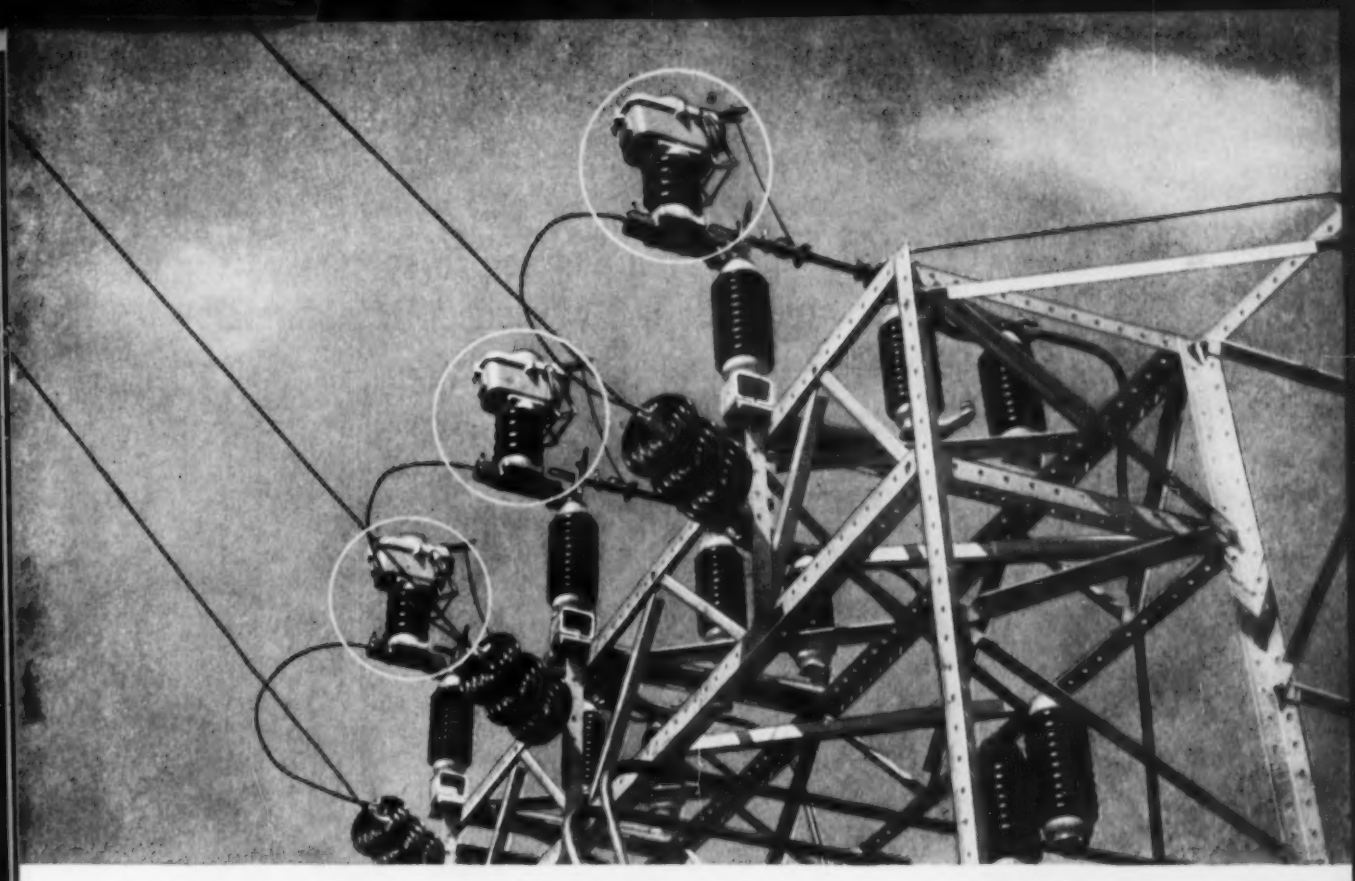


THE NEW L-M OIL INTERRUPTER provides high-speed circuit interruption on sub-transmission circuits without external arc or flame. The unit costs less than half as much as other interrupters for the same application.

New High-Voltage Oil Interrupter For Only $290 Per Pole for 69 kv

Units cost less than half as much as other interrupters for the same application—$240 per pole for 23 kv and 34 kv, $265 per pole for 46 kv, and $290 per pole for 69 kv.

Now you can get an economical, high-voltage oil interrupter for sectionalizing and switching on sub-transmission circuits. The unit is capable of interrupting load currents, line charging currents, and transformer magnetizing currents. It easily meets NEMA and AIEE standards, including the ice test.

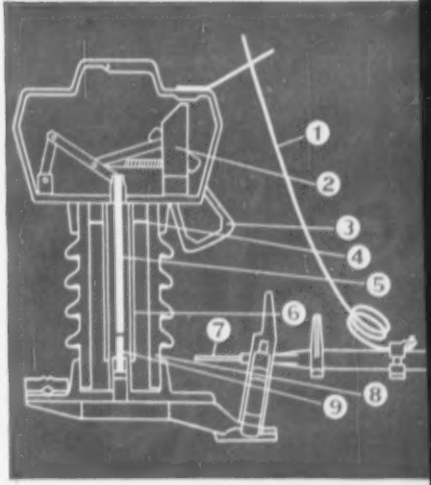
Contacts Separate At High Speed

The L-M interrupter consists of an oil-filled unit housed in a porcelain insulator, and a rod to shunt the current through the interrupter while the main switch blade is being disconnected. As the switch blade rises, it engages a spring trip lever which rises to over-toggle position, causing the contacts within the unit to separate under oil at high speed. The speed of the moving contact is independent of the operation of the main switch blade.

Contacts have long-life copper-tungsten arcing tips. All linkages are made of aluminum for lightness and fast operation. A simple fiber-washer arrangement provides a spiral passage for the pressure-generating arc, forcing oil and un-ionized gas around the arc core as the moving contact is withdrawn. This assures rapid arc extinction at low current values.

Ratings 23 kv Through 69 kv

L-M's new interrupter is available in 23, 34.5, 46 and 69 kv ratings. Continuous current rating is 600 amperes; momentary and short-time current ratings are 40,000 amps. for 10 cycles, and 25,000 amps. for 4 seconds. The unit can be installed on any of L-M's PV switches without altering the original parts. The addition of the interrupter does not change the electrical clearance or the phase spacing of the switch.



Cutaway View of Oil Interrupter

1. By-pass rod
2. Toggle mechanism
3. Trip lever
4. Oil level
5. Moving contact
6. Interrupter
7. Trip rod
8. Bushing
9. Stationary contact

Get Complete Information

Ask your L-M Field Engineer for more complete information on L-M's new high-voltage oil interrupter and on L-M's outstanding power switching equipment. Or write Line Material Industries, Milwaukee 1, Wis.

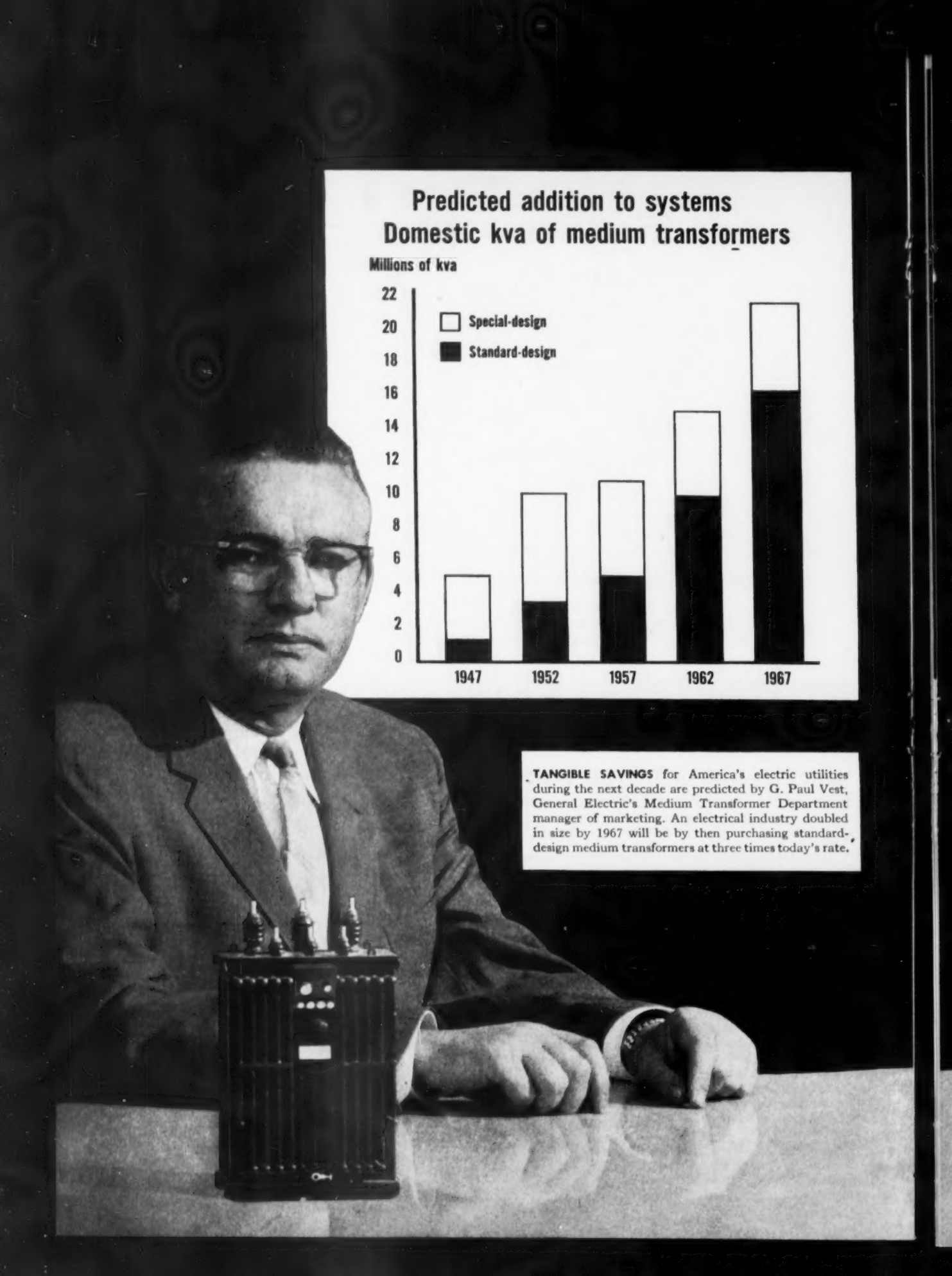
317

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

LM Power Switching Equipment

McGRAW-EDISON



TANGIBLE SAVINGS for America's electric utilities during the next decade are predicted by G. Paul Vest, General Electric's Medium Transformer Department manager of marketing. An electrical industry doubled in size by 1967 will be by then purchasing standard-design medium transformers at three times today's rate.

A GENERAL ELECTRIC 10-YEAR FORECAST:

Tripled volume of standard-design transformers to bring savings to utilities

By 1967, an electrical industry doubled in size over the past decade will be purchasing standard-design medium transformers at three times today's rate. The industry will be realizing tangible savings by purchasing standard-design units direct from manufacturers' stock. So forecasts G. Paul Vest, manager of marketing at General Electric's Medium Transformer Department in Rome, Ga.

This prediction is based on continued acceptance of standard-design medium transformers by utilities. For, as acceptance of standard-design units grows, manufacturers can move toward production of "stock" medium transformers. These transformers cost 8 per cent less than specials and will save utilities over $40,000,000 during the next ten years.

Standard-design transformers also will relieve transmission-system engineers of time-consuming details of transformer design and specification.

YOU GET REAL BENEFITS *TODAY!*

But you don't have to wait 10 years to realize the benefits of standardization. You can obtain true economy, now, by specifying General Electric RM (Repetitive Manufacture) transformers. These standard-design units also offer:

Faster shipment—Ten-week shipment is now average for General Electric RM medium transformers. This compares with an industry average of more than 16 weeks for specials.

More and better features—Standard design makes it economically possible for G.E. to offer such extras as Formex* insulated windings, control-center arrangement of instruments and accessories, reversible junction boxes, and many others.

Higher quality for longer life—G-E repetitive manufacture techniques permit 18 assembly-line tests and 22 quality-control inspections during manufacture, to give more dependable operation over a long service life.

G.E.'S BROAD RANGE OF STANDARDS HANDLES 90% OF ALL JOBS

If your company is not yet taking full advantage of the benefits of medium transformer standardization, act today. Ask your G-E Apparatus Sales Engineer to show you how G.E.'s broad range of standard RM medium transformers can meet the large bulk of your needs, and also work efficiently with older, special transformers now on your system. General Electric Co., Schenectady, N. Y.

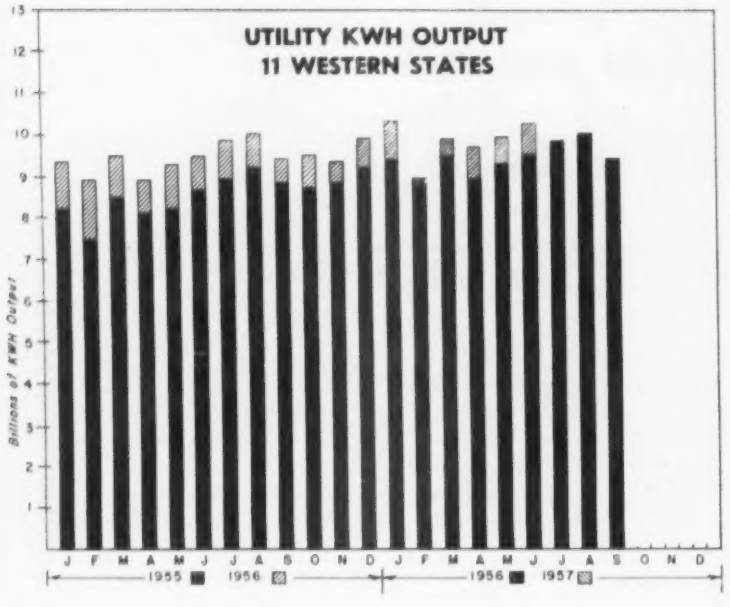
416-9

*Reg. Trade-mark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

----How're We Doing?



Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Per Cent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Northwest	Pacific Southwest	U. S. Total
Aug. 10	+8.0	+ 7.3	+10.5	+4.7
Aug. 17	+6.3	+10.5	+ 8.9	+5.2
Aug. 24	+6.3	+ 9.9	+ 8.6	+6.0
Aug. 31	+2.8	+ 7.9	+ 9.4	+5.0

Amber Light

The need for new productive capacity does not appear to be quite so promising as it has been for the past 10 years. Result: a cautious trend in budgeting new capital outlays by business and a dip in the confidence that 1958 would be an all-time record breaker for new construction. For six months, durable goods sales have exceeded orders booked, thus cutting into backlogs (by about 7%). As yet, this is nothing serious but it has a tendency to move decision-makers toward procrastination in expanion planning.

Pay Checks

Far Westerners enjoy the highest per capita income in the land—20% above the average U. S. citizen and nearly double that of the lowest region—the Southeast. West Coast average—in case you haven't totaled it up lately—is about $2,325 per person.

Speaking of income, August marked a new high for personal income nationally—a $347 billion annual rate. It's hard to reconcile a business slowdown with pocket money of this magnitude.

N.B. For the current IBM prediction of the winning number of Electrical West's annual Kilowatt-hour Rodeo—see page 106.

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Rome's lightweight Triplex goes up much faster than open-wire service drops

Reduce your service-drop installation time—even by a few minutes—and you save money. Now it's possible to speed up practically every job.

High dollar savings. Rome's aluminum Triplex can be installed much faster than open-wire service drops. Multiply the time it saves by the high cost of keeping your crew on the job, and you'll see how great the savings are in manpower costs alone.

Why such savings are possible. The lightweight construction of Rome's aluminum Triplex is behind these important savings. This single-cable assembly weighs less than conventional copper three-wire service drops, so it's easier to handle and quicker to install.

Rome's aluminum Triplex offers simplicity in construction. A self-supporting cable, it consists of specially insulated power conductors spiralled around a "straight-away" neutral conductor. Less handling is required to pull it off the truck, string it, and connect it than conventional three-wire service drops.

You can purchase this economical service drop cable in handy 500-foot cartons, paper-wrapped coils, or on non-returnable reels.

Specify Rome's aluminum Triplex for your next job. Contact your nearest Rome Cable representative for more information—or write to Department 366-B and ask for Bulletin RCP-361. Rome Cable Corporation, Rome, N. Y.

Plus these benefits!

Costs Less. Initial cost is lower than conventional copper Type SD service drop cable.

Lasts Longer. Maintenance and service interruptions are few compared to open-wire installations. It offers maximum resistance to storms, wind and ice loading.

Fewer Poles Required. Fewer poles are required and longer spans are possible with mid-span taps on secondary Triplex.

Less Hardware Needed. Service tap connections at the pole require less hardware than a conventional three-wire tap.

ROME CABLE

CORPORATION

EW news roundup

I'M A NICE CUSTOMER—This is just a brief excerpt from a longer, worth-while commentary appearing in the *Lincoln-Mercury Service News*.

"I bought a toaster that burned out after two weeks. The store people were so busy telling me I burned it out on purpose, I didn't get a chance to ask them if they knew where I could send it to have it repaired.

"I never kick. I never nag. I never criticize. I wouldn't dream of making a scene, as I've seen people doing in public places. I think that's awful.

"I'm a nice customer! I'll tell you what else I am. I'm the customer who never comes back!"

—EW—

San Francisco's Streets Utilities Committee has a booklet out on the subject of "Minimizing Traffic Interference Caused by Utility Work in Streets." Safety engineers, as well as crew foremen, would be interested in the "dos" and "don'ts" discussed and illustrated to show how to get maximum safety with minimum traffic interference.

—EW—

$681 — The tax raisers are so skillful that much of the nation's tax bill is buried under a wide variety of schemes and devices that makes tax collecting a silent raid on the public's pocketbook.

The Census Bureau, however, has done a little sleuthing to come up with a figure of $114.5 billion as the total gross expenditure by all government agencies. This is $5 billion more than the expenditures for 1955 and amounts to $681 per person in the United States. The total government revenue reported for 1956 was $121.2 billion—taxes being $91.6 billion of this total.

The really alarming part about this stupendous tax bill lies in its proportion (one-third) of the total national income. The Tax Foundation points out that it takes 1½ days' pay each week for workers to meet their tax obligations. Stated another way, 30% of the people are actually working full time to support their government.

—EW—

SWINGBACK — Two Bechtel engineers, J. M. Lindquist and John F. Peterson, in a technical AIEE paper stated that economic circumstances had dictated a swing back to increased use of public utility power in oil refineries. Citing Standard Oil of California's huge Richmond refinery as an example, they say that the company must rely heavily on electric utility power for the future load growth that will increase the refinery demand from its present 49 mva to 80 mva within the next four years. A few individual customers with that kind of demand pep up the utility financial statement.

—EW—

NEW APPLICATIONS—Two new applications for electric heat appear to give promising possibilities for load development. Many architects are giving a closer look to electric heating for schools. The basic economics appear to be sound and, from the utility standpoint, school heating is essentially an offpeak application and complements both the summer air conditioning load and the winter lighting peak.

Off in another direction, our English contemporaries are experimenting with the use of buried electric heating cables in roadways at dangerous intersections, hills and curves to prevent ice formation. Preliminary results as reported by the Board Research Laboratory indicate that from 1 to 6 w per sq ft will keep roads clear of ice in the English winter. There are lots of places in the West where something like this not only would be mighty convenient to the motorist but also a substantial source of revenue for the utilities.

PRICE HIKE — Utilities going to the market place for equipment and supplies are finding higher price tags at every turn. One of the recent ones was on many of the General Electric Co. Transformer Division products.

The raise is about 4% on power transformers in large and medium sizes (above 500 kva), and several other items.

Another increase, by the same company, was initiated on high-voltage switchgear. This about 7%. Medium-voltage units will be about 5% higher.

Down the line, higher costs of labor and materials are cited as the reasons for the increases.

—EW—

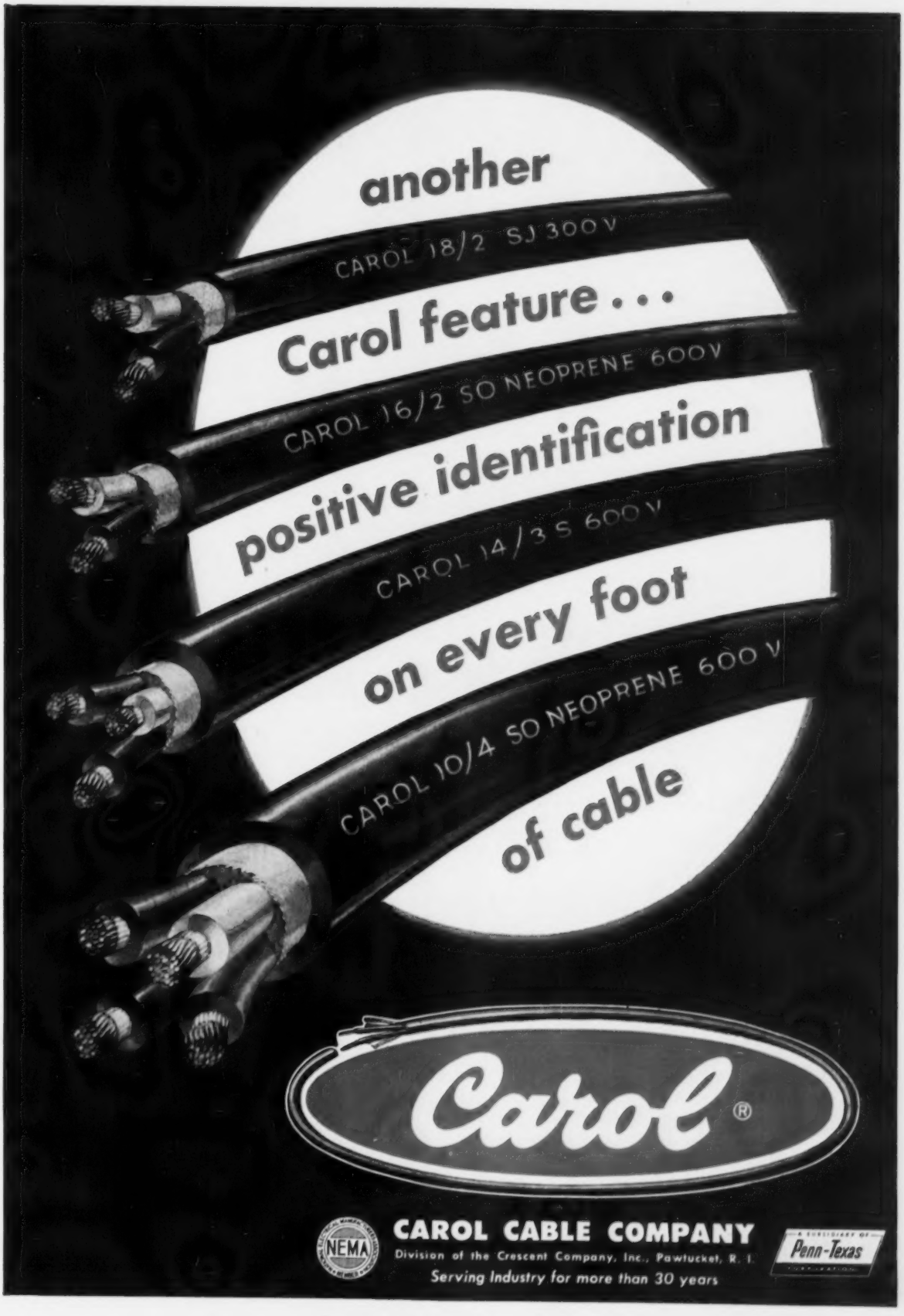
Portland General Electric Co. was one of the first utilities in the country to offer free inoculations of Asiatic flu vaccine to its employees. Roland Blantz, PGE manager of training and safety, said voluntary acceptance was nearly 100% by the utility's 1,700 employees.

—EW—

COMBINE — The State of Washington's public utility districts have banded together to apply to the Federal Power Commission for a preliminary permit to construct the Ben Franklin hydro project on the Columbia River near Richland, Wash. As proposed, 12 generators would supply 480,000 kw of installed capacity initially with energy going to the member PUDs and surpluses, if any, into the Northwest Power Pool.

—EW—

COMPROMISE — Congress went home leaving the Atomic Energy Commission with enough money to carry out its 1957-58 program but with some specific instructions that pleased hardly anyone. About the only item that made everybody happy was the authorization to provide $500,000,000 worth of govern-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MICA IS BEST

TODAY'S EMPHASIS is on speed — both in domestic appliances and industrial applications. Mica is a wonderful insulating material. It has ample mechanical strength, will not react with resistor substances and is unaffected by oils or organic solvents. It will not crack under extreme temperature changes nor lose its dielectric value.

FLEXIBLE MICA & COMPOSITES
Class B and Class H
Sheet, roll and tape forms
Formed slot liners

MICA TUBING
Round, square, rectangular
Class B and Class H
Specified dimensions

COIL & SLOT INSULATION
Molded or formed to specified dimensions

Y-26 HIGH HEAT MICA
Completely inorganic. Combines the durability, high electrical insulation value, temperature resistance and high reflective value. It is available in large sheets or full size pieces stamped to specified dimensions.

Tell us your area of interest and we will send you large samples for testing —

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For the nation's finest electrical, electronic, and industrial supplies, make
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Power Supply for Mission

A missionary hospital in the Belgian Congo will have daytime electric power as well as at night from a 125-kw hydroelectric generating unit that has been turning out power for Portland General Electric Co. on a mill race in Salem, Ore., since 1938. PGE sold the unit to Dr. Donald Nelson, a medical missionary for the Conservative Baptist Foreign Missionary Society, for a token payment of $1. He has dismantled the unit and will take it with him on his return to the missionary society's 60-bed hospital unit on the Rutshuru River near the eastern border of the Belgian Congo. Dr. Nelson estimated value of the generator unit to the society at $27,000 but said it would have cost $60,000 to buy a new one

ment indemnity for each atomic reactor project in the U. S. This insurance program of a magnitude far and away above the capabilities of insurance companies, opened the door for more private atomic plant construction.

The AEC was directed (over its objections) to prepare plans and costs for a large-scale single- or dual-purpose reactor for the production of special nuclear materials and to proceed with the design and development work on a large-scale natural uranium power reactor, both to be reported on by April 1, 1958. These two projects, if subsequently authorized by Congress, would put the government in the atomic power business.

Again, over AEC objections, Congress ordered it to contract directly with manufacturers to produce small power reactors for three electrical cooperatives and one municipal system. AEC also was directed to commence construction during the current fiscal year on a 15,000-electrical-kw experimental reactor utilizing plutonium as fuel — total cost $15,000,000 (see quotation on editorial page 93).

—EW—

BACKWASH — The famous Dixon-Yates controversy reached the U. S. Court of Claims on Sept. 25. There the Middle South Utilities and the Southern Co. are presenting their

case to obtain $3,500,000 back from the government as compensation for expenses incurred as a result of the cancellation of the Dixon-Yates contract by President Eisenhower a year ago last July.

Memphis, which decided to build its own steam plant rather than buy contract power from the Dixon-Yates plant, now finds it will pay almost double the Dixon-Yates cost for bus-bar energy. And, in addition, the nation's taxpayers very likely will have to foot the bill for the just claims for damages that were incurred when a bona fide government contract was canceled at the behest of the public power proponents.

—EW—

For people who like to deal in ratios, the World Power Conference deliberations at Belgrade produced the following. "For every $1,000 of capital invested in manufacturing industries an addition of at least $100 in new power facilities is required." Seems reasonable.

—EW—

SUBMARINE SOLUTION — The Japanese electrical system operators have more than unusual amounts of trouble with submarine cables because of the dense shipping and fishing traffic around their shores. To get better protection for buried circuits, they have abandoned the sea plow that formerly trenched cables in to a depth of 1½ ft in favor of a new high-pressure water jet that can bury the cable up to a depth of 5 ft depending upon the constitution of the sea bottom. The rocky bottom areas of the ocean can be avoided through the use of a new instrument that plots the composition of the ocean floor along proposed cable routes.

—EW—

AWARD — Three prominent men who have been or are associated with Electro-Motive Division of General Motors have been selected to share the 1957 Elmer A. Sperry Award "For developing the diesel-electric locomotive which helped revolutionize American railroading."

Harold L. Hamilton, Los Altos, Calif., retired vice-president of General Motors and founder of Electro-Motive, is one of the three.

Another is Richard M. Dilworth, Hinsdale, Ill., retired, who was chief

Here's a cable supporting system with space reserved for future needs

COPE CABLE TROUGH GIVES YOUR SYSTEM ROOM FOR GROWTH!

Cope cable trough design gives you greater load carrying capacity per dollar *now—plus built-in system expansibility* that will minimize the cost of future system expansion. A *single* 24" wide section of Cope cable trough supports as many cables as 16 lengths of 4" conduit. Additional cables can be quickly and easily laid in *existing* trough as new equipment installations require. The lower *first* cost of a Cope cable trough installation *saves you money a second time* when you need to increase or expand your power distribution system!

Reduced System Maintenance Costs. Easy-to-get-at Cope cable trough also eliminates costly maintenance problems down the line. Once cable is laid in Cope expanded metal trough, it's readily accessible for easy inspection, repair . . . or *re-routing* when system changes are required. And greater installation flexibility of lightweight Cope cable trough and a complete line of system accessories and fittings reduce design time up to 25% for laying out the most complicated system . . . assure easy system maintenance even in the most cramped quarters.

Cut Costs Three Ways. You save *three ways* when you specify Cope cable supporting systems with pin-type coupler . . . trough, ladder or channel.

- **LOWER FIRST COST**
- **LOWER INSTALLATION COSTS**
- **LOWER SYSTEM MAINTENANCE COSTS**

Discuss these advantages for *your* installation with a qualified Cope representative—or write to T. J. Cope Division, Rome Cable Corporation, Collegeville, Pa.

1008

T. J. COPE *Division*

ROME CABLE CORPORATION

INDIANA STEEL & WIRE CO.
Crapo Galvanizing
MUNCIE IND.
Signs along the lines of Crapo GALVANIZED STEEL STRAND PERFORMANCE
For dependable performance . . . insist upon Crapo Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes Crapo Steel Strand first choice for guys, messenger and overhead ground wire.
The famous Crapo galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.
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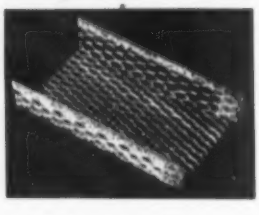
COPE CABLE TROUGH
READY FOR CABLE IN MINUTES



Available in galvanized steel and aluminum. Also in mesh or solid construction. Furnished in a variety of widths from 6" to 24" and in 8', 10' and 12' lengths. COPE Cable Trough is installed quickly with patented COPE pin-type coupler. Recommended for non-metallic sheathed power cables.

COPE Cable Ladder and Cable Channel and system Supports are also available.

For further information contact

GEO. E. HONN CO.

420 Market Street San Francisco, Cal.
Phone SUtter 1-7352

engineer of the company from 1926 to 1951.

The third is Eugene W. Kettering, also of Hinsdale, who is now director of research for Electro-Motive.

The award will be presented at the fall general meeting of AIEE.

—EW—

The report from Tobe Deutschmann Corp. is that a gigantic installation (six banks of 50,400 kvar, three-phase, 69-kv) of power factor capacitors earned the praise of Bureau of Reclamation experts. The installation is at the Folsom-Elverta substation of Sacramento Municipal Utility District. It was energized recently with an almost total absence of failure, the company reports.

—EW—

GOOD PROSPECTS – Economists still tell us that business is good and can get better by the end of the year. Consumers, they say, are expanding their purchasing and they are in shape financially to expand it still more "if they are sufficiently titillated by good fall selling." Autos and appliances are about the only two major lines that are not feeling the reaction of the public's spending mood. The military cutbacks can be absorbed by additional consumer spending with barely a ripple in the over-all economic picture.

—EW—

CYCLE – Research expenditures, now a whopping $7 billion annually, spark plug a cycle that apparently is responsible for much of the blossoming economic growth. According to the McGraw-Hill Department of Economics, the cycle runs as follows: five years for commercial development of new products coming out of the research laboratory; two years to build markets for these new products; then capital expenditures begin for additional productive capacity to supply the demand.

In the period 1951-58 research expenditures almost tripled; by 1956 new products resulting therefrom were responsible for nearly $30 billion worth of sales, which figure will go up beyond $80 billion by 1963; beginning in 1958 entirely new plants (about $2 billion worth) will be a-building and these capital expenditures will increase to a rate of about $7 billion annually by 1965.

Of course, all this time more research dollars are being spent to develop more new products that will open new markets that will require more new plants still further in the future.

—EW—

CUSTOMER – Steam power production holds the best immediate hope for use of coal resources in the State of Washington, according to Earl Coe, state conservation director.

Coe, speaking before the sixth conference of Coal Research Inc., said:

"I believe we are on the doorstep of the large use of coal waste for steam electric production." He cited as a reason that most hydroelectric sites already are being developed.

—EW—

ENTICEMENT– "Target: Future" is the name of a 36-week television series designed to attract Denver high school students into engineering.

The series is being sponsored by the Rocky Mountain Section of the Institute of Aeronautical Sciences, with 27 private firms, colleges and universities providing money, personnel and facilities. Programs are weekly and last 2½ hours.

—EW—

BONNEVILLE STATISTICS–Figures for fiscal 1957 from the BPA make interesting reading. Energy sales were up to 28.2 billion kwh, an increase of 8.6% for the period. The average revenue per kwh was 2.3 mills.

Also of interest is the breakdown of sales: Publicly owned utilities took 28.4%; privately owned companies, 23.4%; federal agencies, 6.7%; and Northwest industries, 41.5%.

Incidentally, system losses totaled 5.7% at a 70% load factor.

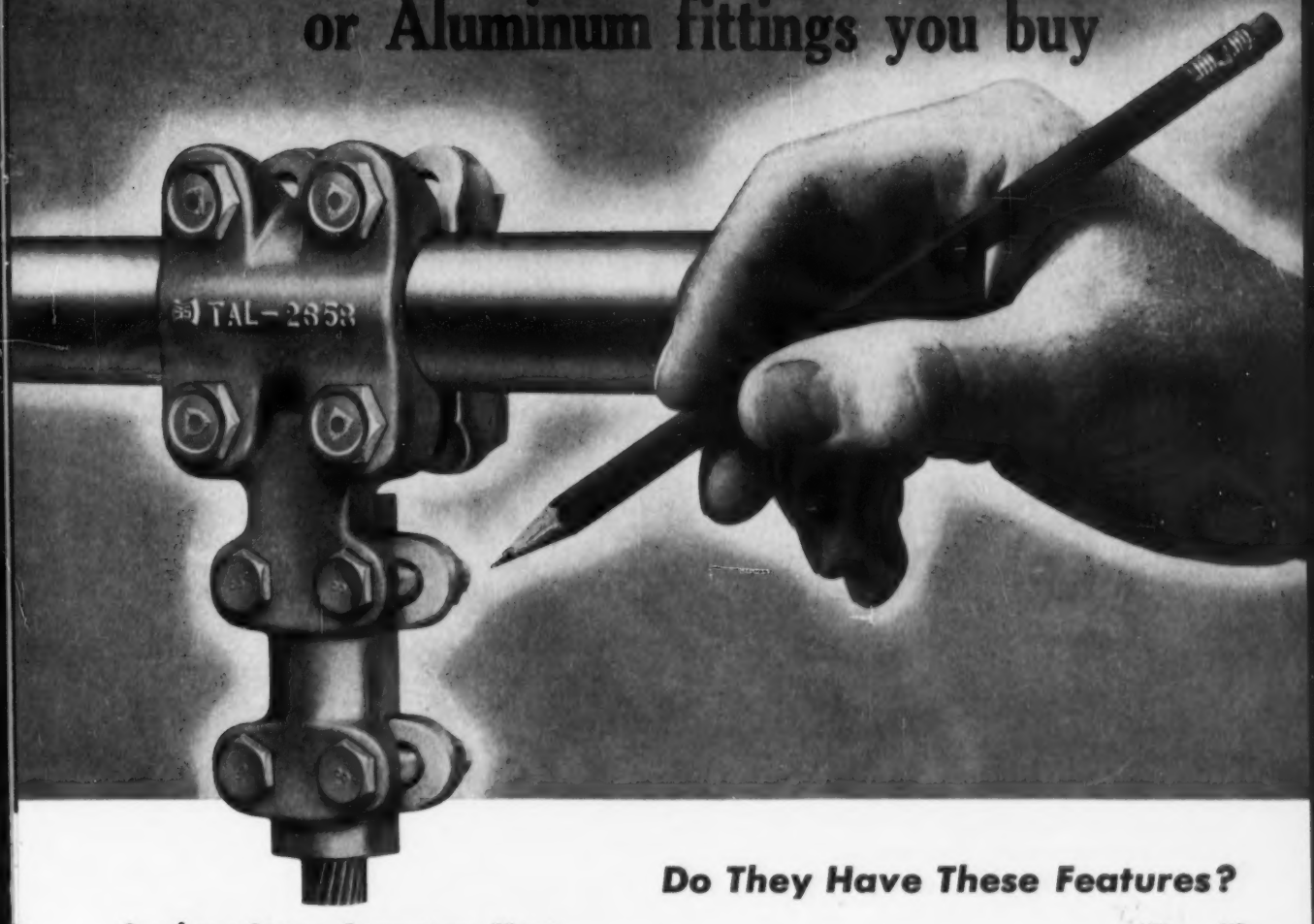
—EW—

MEETING DATES – Here are two meeting times and places you may want to note.

The American Power Dispatchers Assn. will hold its fall annual meeting in Fresno, Oct. 25-26, in the PG and E auditorium, 1401 Fulton St.

Professional Engineers of Oregon will meet October 18-19 in Eugene. Impact of automation on professional engineers is the meeting theme.

CHECK POINTS for the Bronze or Aluminum fittings you buy



Southern States Connectors Meet Every Single Requirement

Never underestimate the importance of a good connection!

A faulty connection can mean trouble and cost you money!

The failure of any connector, no matter how insignificant, can cause a circuit interruption as surely as any major system component. That's why it pays to select the fittings for today's heavily loaded systems with a great deal of care.

Take a look at the check list at right. If you can't answer "yes" to these questions, then the fittings going into your system may be inadequate.

Southern States bronze and aluminum fittings meet every single requirement listed.

For complete information write for catalogs describing Southern States' complete line of bronze and aluminum fittings.

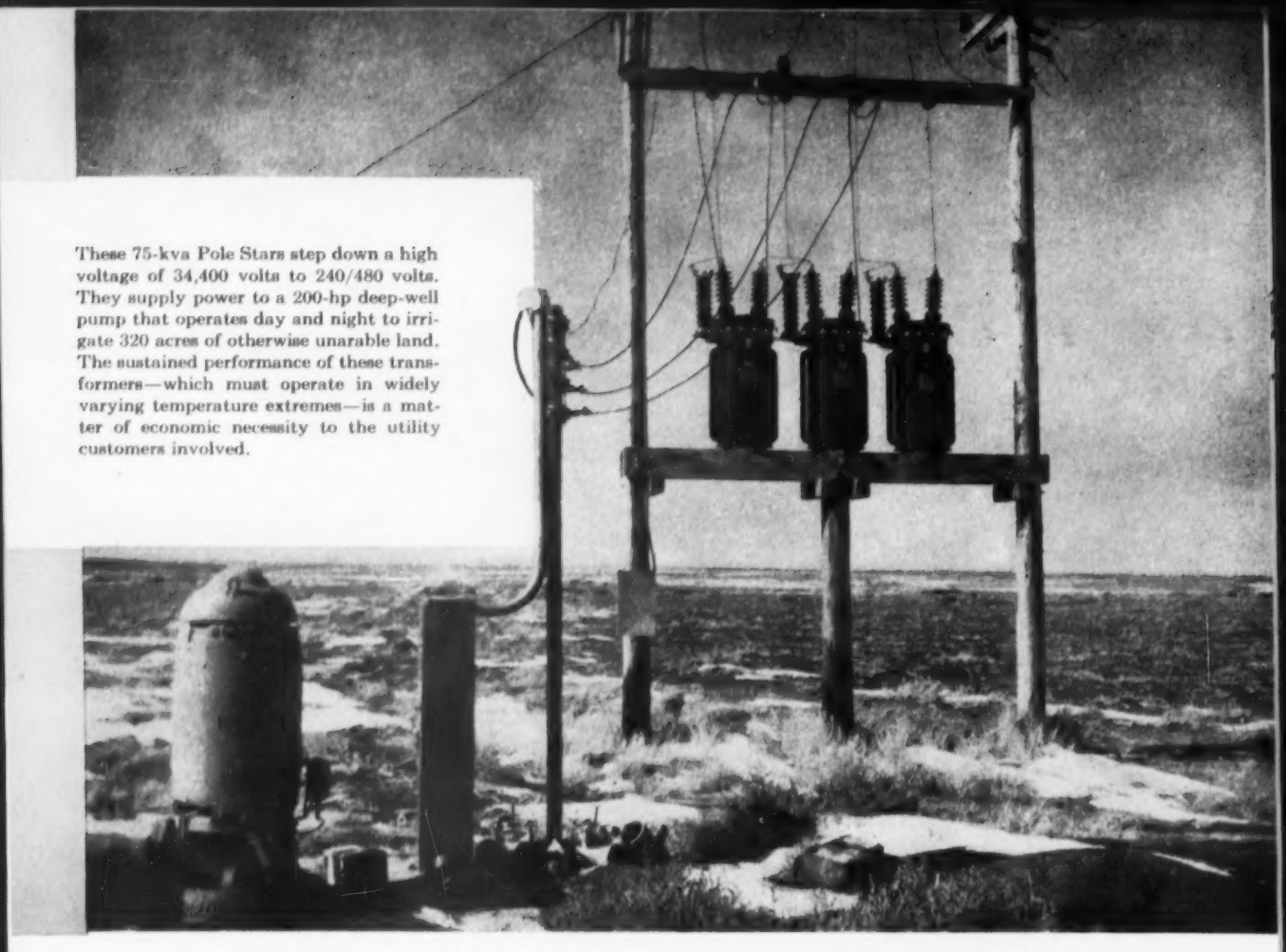
Do They Have These Features?

	YES	NO
Are they structurally strong enough to prevent pull-out of conductors?	☐	☐
Are stress points rugged with cross-sectional strength to spare?	☐	☐
Are bolt heads recessed for single-wrench assembly and disassembly?	☐	☐
Do contact surfaces accurately match curvature of conductor?	☐	☐
Are contact surfaces finished to provide multi-point engagement with conductor?	☐	☐
Are castings fine grained, with smooth pit-free surfaces?	☐	☐
Are contact surfaces extra-large to provide maximum engagement?	☐	☐
Are bolts of standard size and thread for ready replacement from local sources?	☐	☐
Is the over-all appearance of the connector pleasing and not excessively heavy?	☐	☐
Do they meet NEMA standards in every respect?	☐	☐

LIVE BETTER ELECTRICALLY

IN CANADA: Dominion Cutout Co., Ltd., Toronto

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA



These 75-kva Pole Stars step down a high voltage of 34,400 volts to 240/480 volts. They supply power to a 200-hp deep-well pump that operates day and night to irrigate 320 acres of otherwise unarable land. The sustained performance of these transformers—which must operate in widely varying temperature extremes—is a matter of economic necessity to the utility customers involved.

You Get "Power Transformer Ruggedness" in High Voltage Pole Star Distribution Transformers

With wide experience in the design and construction of power transformers, Pennsylvania Transformer has the specialized knowledge and skill needed to satisfy the rigorous demands of high voltage transformer applications. The internal ruggedness that typifies Pennsylvania's power transformers also is designed into higher voltage Pole Star Distribution Transformers.

For example, the sturdy high voltage lead supports form an integral part of the coil . . . coils have extra bracing top and bottom to protect against possible short circuit forces . . . the core frame is of especially sturdy angle-and-channel construction . . . and tap changers feature power transformer ruggedness in both design and construction.

As a result, high voltage Pole Stars deliver economical, sustained performance in even the most demanding distribution transformer applications. The pictured 34,400-volt installation is a convincing example. For more details contact Pennsylvania Transformer Division, McGraw-Edison Company, P. O. Box 330, Canonsburg, Pa.

McGRAW EDISON

PENNSYLVANIA TRANSFORMERS — POLE STAR

PENNSYLVANIA DISTRIBUTION TRANSFORMERS

EW

regional roundup

Pacific Northwest

► Who holds the long distance sweeping record of the electrical industry? Our nomination goes to Mary Mayer, who has swept through 5,147 miles in the Electric Building, Portland, since March 26, 1922, when, after the untimely loss of her husband, she went to work as janitress for Portland General Electric Co., to raise and educate her three small children. She retired the other day, after 35 years, on the eve of the day the eldest of her six grandchildren entered college. Of course the company put on a party for her, presents and everything, with C. B. Rose, building superintendent, officiating.

► For the second time in a few months, Pacific Power & Light Co. has chalked up another one million accident-free man-hours worked, to qualify for the National Safety Council and EEI awards. The score was 1,012,400 man-hours worked between March 17 and June 10 without a disabling accident. Fons J. Hughes is safety engineer.

► C. Herald Campbell, personnel director for PP&L, was chosen to be one of four keynote speakers at the annual workshop of the EEI industrial relations committee in Chicago in the middle of September. His subject was "Developing Morale and Loyalty."

► Largest electrical job in Wyoming went into service Sept. 12 when Pacific company officials dedicated 251 miles of 161-kv transmission line from Billings, Mont., to Casper, Wyo. The line, which runs through Buffalo, Wyo., and the Yellowtail power site on the Big Horn River, ties Pacific's Wyoming system in with Montana Power Co. and thence in with the Northwest Power Pool. Its cost: $7,200,000, including substations.

Dedication ceremonies took the form of simultaneous meetings hooked together by telephone. John Dierdorff, vice-president, spoke in Buffalo and Paul B. McKee, president, in Casper. George F. Mackenzie, vice-president and treasurer, was mc.

► Preparatory to bringing in power from its Swift development and other plants on the Lewis River, PP&L bought 73 acres of farm land in eastern Multnomah County between Portland and Gresham, as the site of a substation. At the same time, the company is negotiating for rights-of-way for alternate routes for a transmission line from the Columbia River to the substation site. Swift's 250,000 kw are due to come in the latter part of 1958. The company has applied for a license to build a 110,000-kw plant at the Muddy site and is investigating the possibilities of the Meadows site, also on the upper Lewis River.

► "Roadside superintendents" are numerous in the Northwest. It has been mentioned in this column that the Pelton development on the Deschutes River in Oregon drew more than 10,000 visitors. Now Idaho Power reports that 11,107 folks have visited its Brownlee construction on the Snake River in about one year's time. There were 1,450 in August. They came from nearly every state in the nation, with a scattering from eight foreign countries, including such distant ones as Saudi Arabia and Okinawa.

► Travelers like fairs too, as evidenced by crowds flocking to the Oregon State Fair at Salem. Here a popular exhibit in the Garden Show was Portland GE's exhibit of garden lighting. The judges named it the best commercial exhibit in the entire fair and awarded it the gold medal. The exhibit was landscaped by Eunice Brandt, landscape architect of Salem, and the lighting was designed by PGE's lighting department, of which Chester Jarrett is manager.

► Other events in the lighting field included a residential lighting school for company people by Pacific Power & Light and a seminar on modern developments in lighting for certain segments of the public by Portland General Electric. Pacific's school, running 2½ days, covered indoor and outdoor applications for the home, was aimed at education of lighting salesmen and home economists of the company. Featured instructors were Kaye Leighton, residential lighting consultant; Lamp Division of General Electric Co., Nela Park, and Walter Potter, lighting application engineer of the G-E Lamp Division, of Portland.

PGE's seminar had a broad objective, being designed to instruct and sell school administrators, architects, builders, contractors, plant and store managers, lighting salesmen and decorators. One day's program was on school lighting, one on commercial and industrial, and one on residential. Total attendance on the three days was 198. The faculty of the seminar consisted of Dr. Richard Feinberg, assistant to the president of the Titmus Optical Co., Petersburg, Va.; Kaye Leighton; and the following local lighting experts: Dick Dilworth, G. Donald King and G. R. Barlogi of Sylvania Electric Products; O. C. Westberg and Fred Farlye of Benjamin Electric Mfg. Co.; Walter E. Potter and W. Glenn Pracejus of G-E Lamp Division; Dwayne E. Seely of Westinghouse Electric Corp.; and Chester Jarrett, Ted Fitch, Del Maulding and Jack Cottingham of PGE. Joint sponsor with PGE was University of Portland, on whose campus the seminar was held.

► Miss Judith O'Flaherty, home service director for Philadelphia Electric Co. and national chairman of the Electrical Women's Round Table, turned her Seattle vacation with her sister into a busman's holiday by accepting an invitation from the Portland Chapter No. 13 of the Round Table to speak to the Portland Chapter the latter part of August. The Portland Chapter is chairmanned by Mrs. Charlotte Dodson, now free-lancing in the home economics field.

Pacific Southwest

► Much more welcome than the Asiatic flu, but almost as contagious, expansion fever is whipping through southern California. Among those with the bug, Anaconda Wire & Cable Co. has broken ground for the first unit of its multimillion-dollar facility in Orange. V. F. Di Lustro, Anaconda's vice-president in charge of manufacturing, made a special trip to the Pacific Coast to help mill manager Edwin Gould lean into a shovel during the ground breaking ceremonies. Feature of the 622,000-sq-ft project will be a 572,000-sq-ft production building which will be designed for ultimate expansion to more than 1,000,000-sq-ft. Plans for an initial 114,000-sq-ft section of the production building are now in the works. Also planned are a 15,000-sq-ft administration building and a 35,000-sq-ft structure to house boilers and processing equipment. They will all be built on the 63-acre site within the next three years.

► Also in the grip of expansion, Appleton Electric Co. of Chicago, one of the world's largest manufacturers of fittings for the electrical industry, has purchased 3.66 acres of land from the Santa Fe Railroad near Maywood, Calif. Appleton plans to erect a building partly to extend its manufacturing facilities on the Pacific Coast, but mainly to achieve a larger warehousing area.

► Meanwhile, Lightcraft of California has already swung into operation at its new $1,000,000 plant at Slauson and Denker in Los Angeles. The 55,000-sq-ft facility houses offices, show rooms and equipment for the manufacture of residential lighting fixtures and lamps.

► Ray Carey, one-time city manager of the little desert community they call Fabulous Las Vegas, has replaced Warren Penn as Southern California Chapter manager of the National Electrical Contractors Assn. Carey is no newcomer to NECA administration. Among his other experiences, he served as the association's chapter manager in Oakland. Penn, who is retiring, will stay on in an advisory capacity.

► The Electric League of Los Angeles course in electrical contractor estimating goes into its sixth year this fall. Classes, which are being given every Wednesday evening, are being conducted by Leo Allen, honorary chairman of the Electrical Contractors Division of the league, in cooperation with the Los Angeles Adult School. More than 300 persons have attended these classes to date to learn the simple methods of making accurate estimates. The classroom is at the Department of Water & Power yard office in Hollywood, and there is no charge for the course. For more information, call DUnkirk 3-4159.

► Los Angeles Postmaster Otto K. Olesen told a meeting of the Electrical Maintenance Engineers Assn. how he handled the lighting for the opening of the Golden Gate Bridge and the Hollywood Bowl. It seems Olesen hasn't always been involved in just making sure that penny post cards carried a two-cent stamp. Before he became postmaster he owned his own lighting company and had been in the business for almost 40 years.

► Ted Tesman of Agencies Co., representing O. Z. Electrical Mfg. Co. of Brooklyn, reveals that his company is now equipped to cut wire since the installation of a pay-out reel and a take-up machine in the Agencies plant at 848 Traction Ave. in Los Angeles.

► Scope Distributors Inc. of Los Angeles has been appointed distributor of a new televerter by Regency Division of Industrial Development Engineering Associates, pioneer manufacturer of transistorized radios. According to a joint announcement by Regency's sales representative Bill Baron, and Scope President Edward I. Hoffman, Scope will also be southern California distributor for the Regency XR-2, a vest-pocket radio with a private listening ear, and the TR-4, an improved version of the first transistor loudspeaker and radio.

► John Connelly has joined the Los Angeles office of Sylvania Electric Products as a lighting salesman. He was formerly with the company's picture tube plant in Fullerton.

► And Sylvania's Roy Bevan has moved up to the post of chairman of the Southern California Section of the Illuminating Engineering Society, replacing Jake Hochenauer of Smoot-Holman. Audie Ashcraft of Southern California Edison replaces Bevan as vice-chairman, and Frank Lee of General Electric has been appointed to fill the spot vacated by Ashcraft as secretary-treasurer.

► Jerry Phillips, vice-president in charge of sales for Cords & Cables Ltd., division of National Cable Co. of New York, has appointed Sam Kobert of Los Angeles as sales representative to handle the company's lines of power cable, portable building wire, high-voltage wire and welding cables.

Intermountain

► Early October is one of the busiest ever in the Rockies for electric industry leaders who are kicking off several events to stimulate power use commercially, on the farm, at home and in industry.

Top billing was taken by the Interindustry Farm Electric Utility Council national power use workshop-conference at Denver (Sept. 29-Oct. 1).

More than 600 delegates from across the nation talked over methods of meeting competition in the rural electrification market. Detailed studies were made of problems in selling appliances to rural consumers, standardization of electric water heaters, house heating and other subjects for power supplies.

Host for the affair was the Colorado Farm Power Council headed by W. L. "Bill" Duncan of General Electric Supply Co. Among the speakers were David A. Hamil, national administrator for the Rural Electrification Administration; Fred Strong, deputy REA administrator; Homer Travis, general sales manager of Kelvinator Division of American Motors Corp.; and Paul D. Brooks, commercial vice-president of American Gas & Electric Corp., New York City.

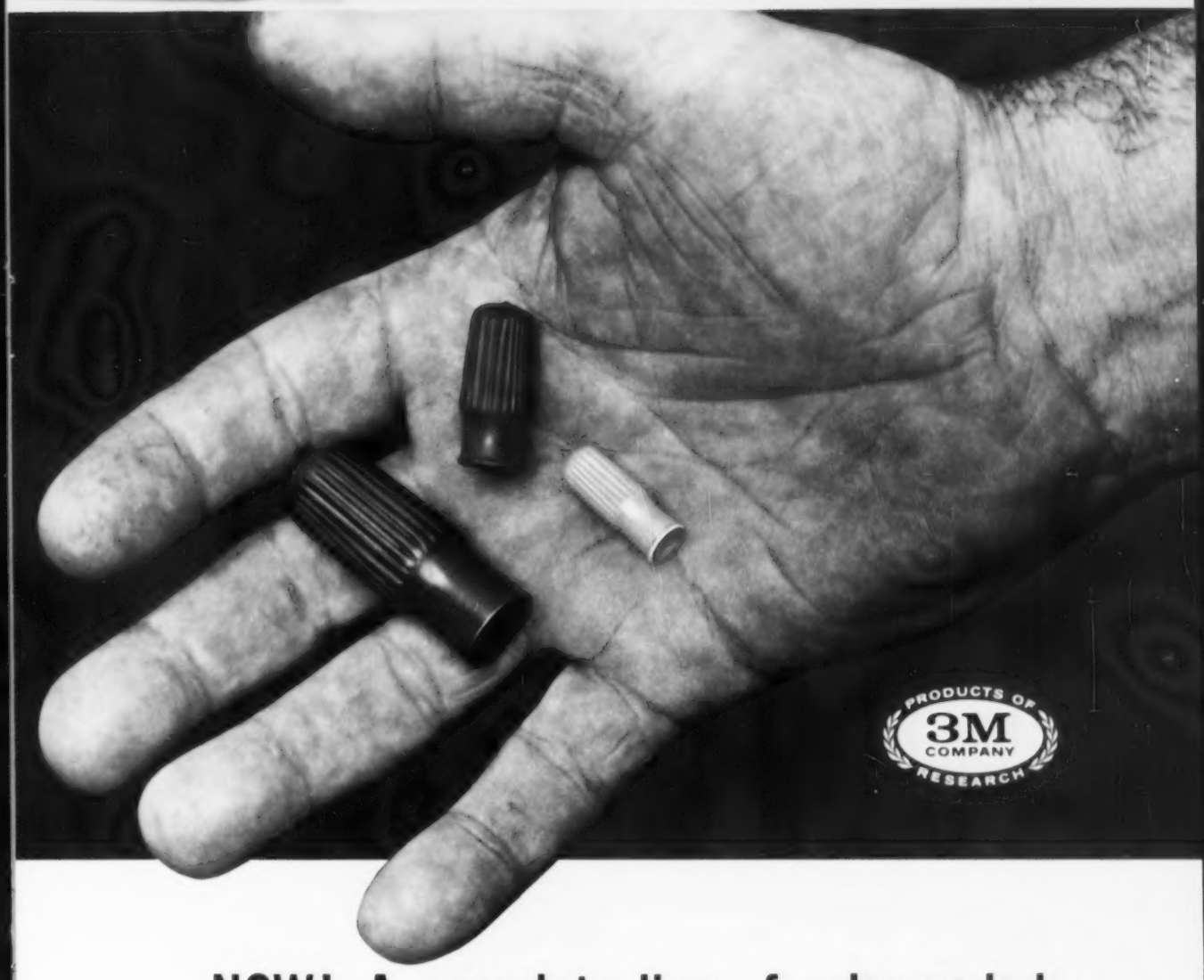
The basic theme was the long-range service and financing aspects of rural load building.

General Electric is conducting industrial productivity forums at Denver and Boise, Idaho, this month in cooperation with the local private utilities.

New developments in automation and electrical controls in industry were presented for management leaders and technicians. More than 200 were invited to the Denver forum Oct. 9 and nearly 300 at Boise Oct. 11. A similar forum was conducted three years ago at Denver and in 1955 at Boise.

Public Service Co. of Colorado and Colorado Central Power Co. cooperated with G-E in sponsoring the Denver meeting. Among the speakers were Guy Thomas, commercial vice-president, and L. R. Patterson, assistant vice-president for electrical operations, both of Public Service.

One of the main speakers at the Boise meeting, co-sponsored by Ida-



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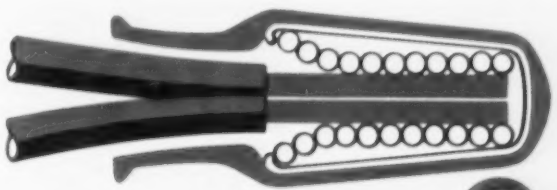
REG. U.S. PAT. OFF. SCOTCHLOK BRAND Electrical Spring Connectors

Strong . . . the tightest gripping electrical wire connectors you can use. *Fast* . . . just "screw" them onto the wires . . . no special tools . . . no fumbling . . . *pre-insulated.* Reinforcing steel shell gives extra strength; prevents wire break-through. And you know your splice is tight because it feels right!

"live" Spring Action!

The strength is in the spring!

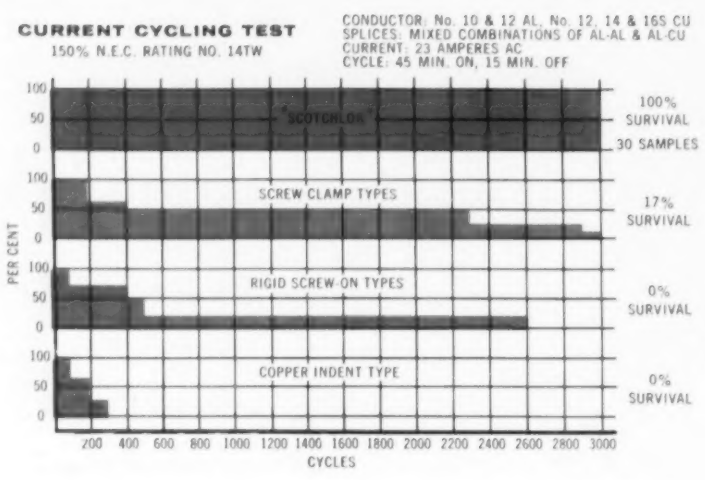
"SCOTCHLOK" Connectors grip wires with a "live" spring action that won't let go. Connection is vibration-proof . . . holds tight regardless of thermal or mechanical change.



See FREE SAMPLE OFFER on next page

PROOF! "SCOTCHLOK" outperforms all other connectors!

THIS CHART SHOWS the results of endurance tests run on samples of four different types of connectors. Samples were tested on conductors #10 & #12 AL; #12, #14 & #16S CU using mixed combination splices of AL-AL & AL-CU. When subjected to repeated current cycling, only the "SCOTCHLOK" with *live* spring action survived *all* the tests *all* the time without loss of grip or conduction efficiency.



Check these "SCOTCHLOK" Advantages:

- Just 3 sizes needed for *all* common connections.
- Unbreakable vinyl insulation doesn't dry out, chip, crack.
- Steel shell spring-housing prevents cut through.
- Live spring action prevents thermal loosening.
- Triangular shape for easy turn-on application . . . no tools needed.
- Long, conforming skirt protects wires, prevents flash-over.

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SCOTCHLOK Samples

BRAND

SEE FOR YOURSELF how tight the grip . . . how permanent the holding power. Use this handy coupon. Your samples, with complete information, will be sent by return mail.

CLIP AND MAIL *TODAY!*

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ELECTRICAL PRODUCTS DIVISION
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Please send me, without cost or obligation, samples of "SCOTCHLOK" Brand Electrical Spring Connectors types R, Y, and B, together with application and use information.

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Now three types to meet every need:

TYPE Y: FOR FIXTURES. Handles wire range from No. 12 to 18 AWG solid and stranded.

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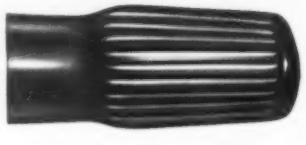

TYPE B: FOR H. D. INDUSTRIAL APPLICATION. 6 to 12 AWG solid and stranded. The BIG connector for the BIG jobs.

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SCOTCH

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No. 33 ELECTRICAL TAPE

"SCOTCHLOK" Brand Connectors belong to the same family of dependable electrical products as famous "SCOTCH" No. 33 Electrical Tape.

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PRODUCTS OF 3M COMPANY RESEARCH

E-YBRM (877,5) B of E

ho Power Co., is Fred S. Rooney of Pocatello, Idaho, resident manager for Westvaco Mineral Products, Food Machinery & Chemical Corp.

► The James H. Blinn Co. of Denver has moved into its new building at 841 Delaware St., another milestone in a career that can be matched by few manufacturers' agents.

Blinn, president of the company, started in 1927 selling dog collars. He now has eight lines, including four in the electrical field that he sells in all the mountain states from the Canadian border to Mexico.

Prominently displayed in Blinn's eye-catching ranch style office is a silver trophy awarded to him this year by Schick Electric Razor Co. for the highest percentage increase above sales quota in the nation. Blinn, who has represented Schick for 17 years, is its only independent representative.

Through the first eight months this year, Blinn ranked third nationally in attainment of quota by distributors of General Electric clocks. He has represented that line 13 years.

Blinn's new two-story building features products of Benjamin Electric Mfg. Co. of Desplaines, Ill., maker of commercial and industrial lighting, which he has represented since 1929.

► There's a big market building up in lighting of highway interchanges, John C. Kreiling reported to the Rocky Mountain Electrical League.

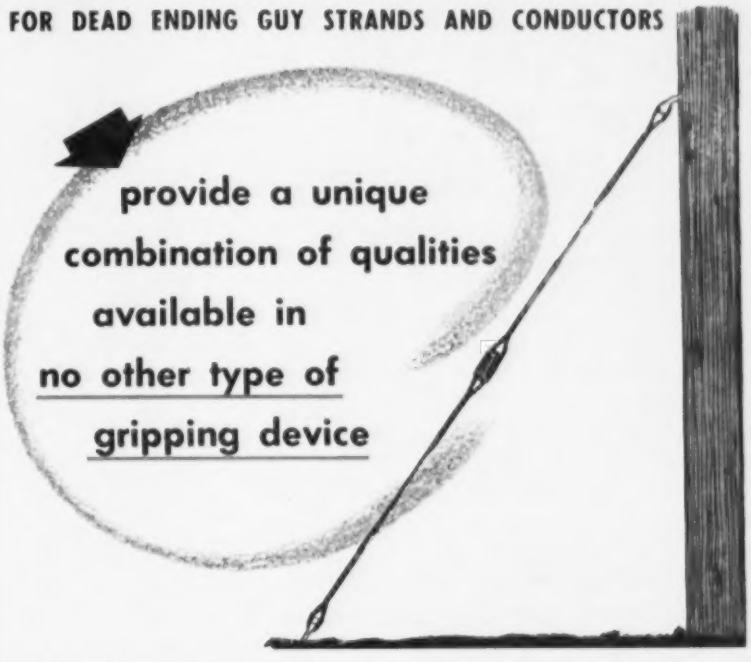
Kreiling, president of the Colorado Society of Engineers, is assistant staff construction engineer for the Colorado Highway Department.

"Why shut down the highway plant, even partially, at sunset?" Kreiling asked. "Fully and continuously lighted highways, which will encourage truckers to schedule night runs and which will stimulate more night driving generally, should be planned for the years ahead."

► A professor of engineering at Colorado College, John O. Kraehenbuehl, was awarded the Gold Medal by the Illuminating Engineering Society for his outstanding contributions to lighting engineering. Kraehenbuehl's service has been mostly in illuminating engineering education. He has written more than 40 papers on illumination and electrical engineering subjects and was engineering consultant on three textbooks on illumination and advanced lighting calculations. He is emeritus

FANNER FANNGRIPS

FOR DEAD ENDING GUY STRANDS AND CONDUCTORS



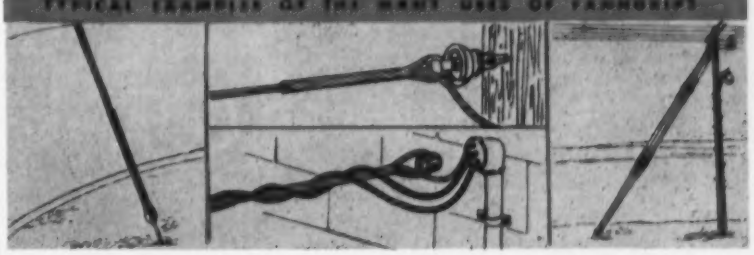
FANNGRIPS are made of highest-grade spring wire specially formed to close tolerances by Fanner's exclusive roll-forming process and properly stress relieved. They provide a permanent grip, even under the most adverse loading conditions. When the FANNGRIPS are installed, slippage is impossible, since the frictional grip is greater than the strand strength.

- Provide maximum load strengths — eliminate variables in application.
- Apply in a minimum of time — eliminate laborious field fabrication.
- Permanently tight, self-clamping — no movement or relaxation due to load reversal.
- Corrosion resisting.
- May be removed and reapplied when necessary.
- Do not damage surface of strands.
- Neat application without bulk — no dangerous or wasteful ends.
- Available in electro galvanized steel, copperweld or aluminum alloy.

No other dead-ending method matches FANNGRIPS economy!

WRITE FOR CATALOG

TYPICAL EXAMPLES OF THE MANY USES OF FANNGRIPS



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- **The exacting craftsmanship in every detail vital to a growing independent manufacturer**
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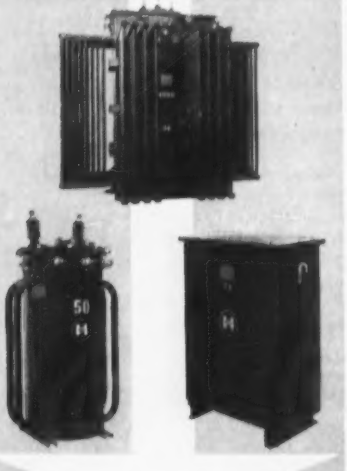
- **All transformers manufactured to NEMA and ASA standards, of course**



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professor of engineering of the University of Illinois where he served from 1952 to 1956, when he joined the Colorado College faculty.

► John "Jack" Samide of Denver retired after 52 years and 3 months with Public Service Co. of Colorado and predecessor companies. He joined the company in 1905 as a messenger boy and became a private secretary in 1918. Since 1940 he served as private secretary to the vice-president of gas operations.

► Chester W. Russell of Rapid City, S. D., retired after 44 years with Black Hills Power & Light Co. He was a line foreman and supervised construction of the first line built from Custer, S. D., to Hill City in 1930.

Northern California

► The traditional symbol of autumn is a falling leaf, but in the northern California electrical industry the season's entry is heralded by meeting notices.

First of the local organizations to get rolling after the summer break was the Ben Franklin Club of Northern California. Because it meets the first Wednesday of each month, it wins the honor of being the annual starter with its early September meeting.

Another sign of the time is the presence of Charlie "Sparks" Huyck in McGraw-Hill's reference room. The Electric Club of San Francisco starts its season with "Old-Timers' Day" and this invariably sends Charlie to the files of ELECTRICAL WEST and its predecessor, THE JOURNAL OF ELECTRICITY, to compile the biographies of our honored electrical industry pioneers.

Golden Gate Section of the Illuminating Engineering Society was off to a brilliant start with its meeting at the new San Francisco Fireman's Fund Insurance Co. building. If this sounds inappropriate, please understand that the new building has one of the outstanding lighting jobs in the region from the standpoint of quality. Even the reflection factors of the colored telephones were given consideration.

It isn't surprising that much of the conversation at the initial fall meetings was devoted to vacation reminiscing. For example, Jack Gregory is full of enthusiasm and gratitude for Hawaiian hospitality. George Gray and Gerry Barton were extolling the virtues of leisurely travel and relaxing days in the Feather River country.

Only one person said it, at one gathering, but a murmur of agreement verified that it is just about time for the credit card bills to arrive, and that there were many other travelers during the summer. Conversation about vacations dwindled away at this point.

► Two companies have been formed from the Ed Pierce Electric Co., Vallejo. Harold Pierce, son of the company's founder, is operating the contracting and wiring side under the banner of Hal Pierce Electric Co., 510 Broadway. His father continues to run the appliance side and has named it Ed Pierce Appliance Co. Inc. Edwin Pierce Jr. is general manager and vice-president.

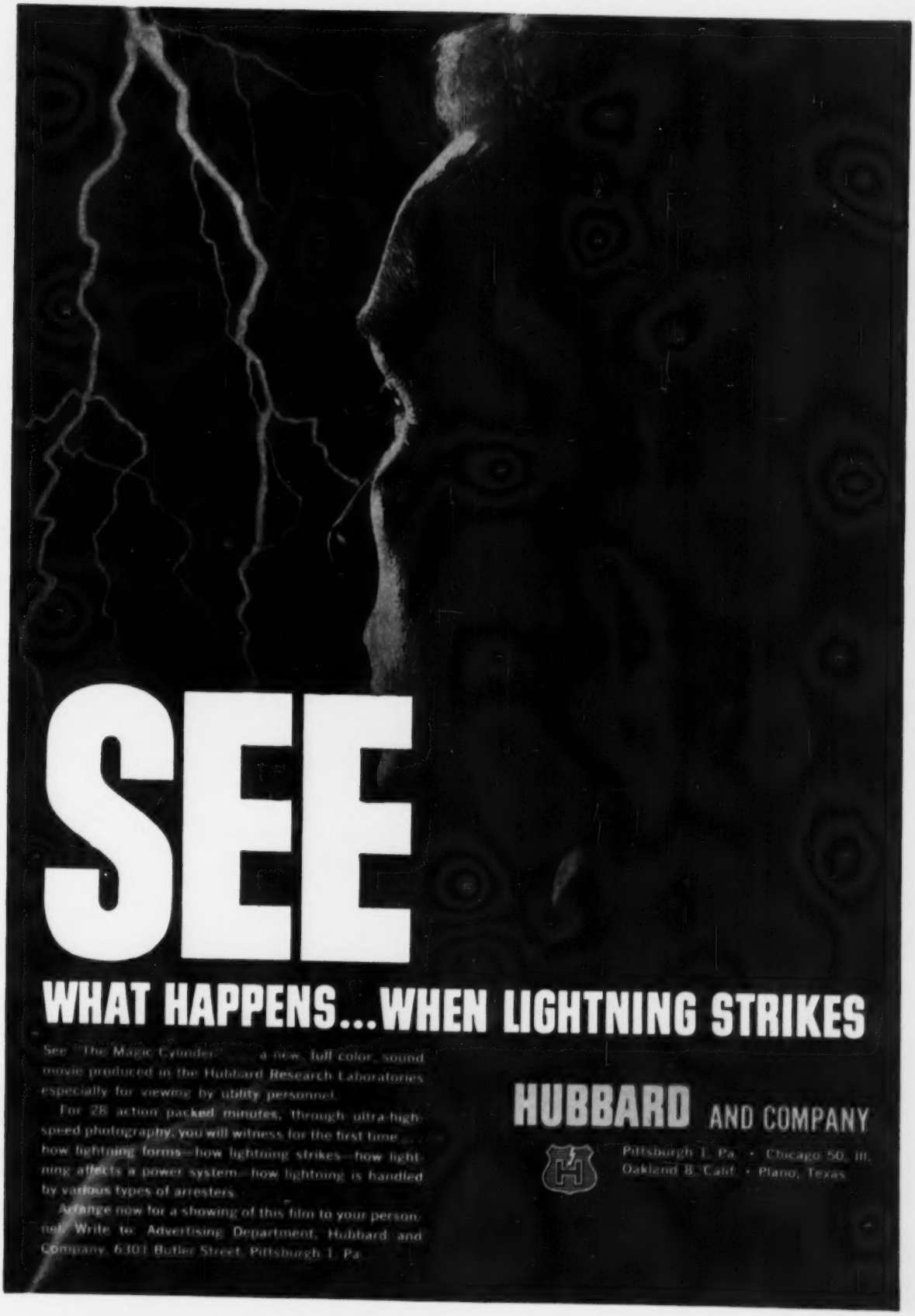
► George Thunen has joined the staff of United Lighting & Ceiling Co., Oakland, as a sales engineer. For the past eight years he has been Oakland representative for Fluorescent Fixtures of California. George designed the first cold cathode lighting installation on the West Coast and was branch manager for Electric Products Corp. for 23 years.

► I-T-E Circuit Breaker Co. and its R & I E Equipment Division are in a new San Francisco district sales office. New address is Rialto Building, Room 106, 116 New Montgomery St.

► Cy Deitrick used one letter for two worthy purposes recently. He pointed out that ELECTRICAL WEST had displayed an Electrend heater—upside down—in the August issue (we were expecting to hear from someone about it). He also passed along the information that Hill & Deitrick has opened a new showroom at 3519 MacArthur Blvd., Oakland. Hill & Deitrick lines are: Gerilite Fixture Co., Lite-Mor Fixture Co., Project Fixture Co., Ray-Vec Heaters, Wesley Lighting Fixtures and—you guessed it—Electrend forced-air heating systems.

► David J. Belock is managing the new Bay Area office of Clark Controller Co. It is located at 122 Second Ave., San Mateo. Belock was formerly an application engineer in the company's Pittsburgh district.

► Another newcomer to the Bay Area is Edward E. Lacy, who is Pacific Coast manager of machinery electrification for Westinghouse. He was formerly South Pacific district sales manager in Los Angeles, and at one time was manager of the Butte, Mont., apparatus office.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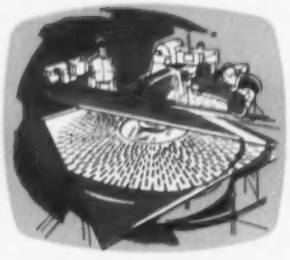
An example of Allis-Chalmers

550-BIL Transformer for 161-kv system raises efficiency, cuts weight, size

Here's dramatic proof of progress!



Close manufacturing control is illustrated by this A-C designed machine used to place precisely the tens of thousands of spacers for directing oil flow.

Valuable experience was gained from building and using this 600-kv transformer for test and research.

A few years ago a 46,667-kva transformer with a combination of reduced insulation, corona-free design, high short-circuit strength and quick-break tap changer would have been the sensation of the industry.

Today, as a result of design research and experience, production of transformers like this is a reality.

Insulation for this 161-kv transformer would normally be used for 115 and 138-kv units. This reduction of two steps is the result of coordination of modern "corona-free" insulation and improved system overvoltage protection. It makes possible substantial savings in weight, size and cost while increasing efficiency without sacrificing reliability.

Concentrated research on reduced insulation was begun by Allis-Chalmers in the 1930's. After the interruption of World War II, new test methods and manufacturing controls were developed to take advantage of this advanced engineering knowledge. As a result, today's A-C transformer is constructed on a triangle of quality: experience . . . design . . . and close manufacturing control.

For details on the engineering of this interesting design, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

leadership in transformers

550-BIL Transformer being shipped to Northern States Power Company.

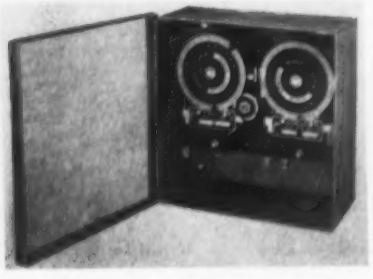
Pioneer Service & Engineering Co.

A-C ALLIS-CHALMERS

A-5510

PRODUCT NEWS

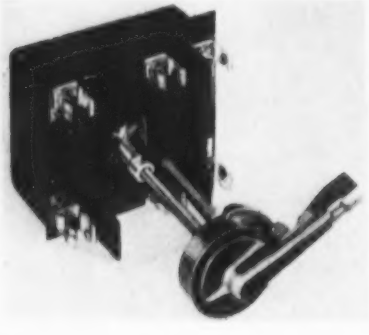
New Designs and Applications



Low-Voltage Control

(1) *Tork Time Controls Inc., Mt. Vernon, N.Y.*

A momentary contact tie switch series announced by this company makes direct automatic control of low-voltage lighting systems and mechanically held contactors possible. What is said to be a new time switch principle is used. The 24-hour timing dial provides automatically a three- to five-second On pulse and Off pulse. On-Off times, however, are set in the same manner as on a regular time switch. Available with any of the standard Tork dials.



Disconnect Switch

(2) *Westinghouse Electric Corp., Box 2278, Pittsburgh 30, Pa.*

A new fusible disconnect switch, designed to fit any panel, is available in 30- and 60-amp ratings from this company, with 100- to 200-amp ratings being added to the line soon. When used as a fused switch, the switches are said to save both space and cost of separate fuse blocks. For use as a disconnect switch, a safety shield without fuse clips is available.

Contact Compound

(3) *Penn-Union Electric Corp., Erie, Pa.*

A new grease-based compound with metallic particles has been developed by this company for use as a sealer for aluminum conductor-connector joints. Contact surfaces are wire brushed through the compound to give simultaneous cleaning and sealing of joints.

Strain Clamp

(4) *Ohio Brass Co., Mansfield, Ohio*

Faster, more efficient installation is claimed for this new strain clamp for distribution dead-end use. A spring clips the keeper piece permanently to the clamp body and eliminates the needs for holding and aligning the keeper or threading nuts on bolts. The clamp takes the full range of conductor sizes from .20 to .50 in. diameter.

Improved Protectors

(5) *General Electric Co., Low Voltage Switchgear Department, 6901 Elmwood, Philadelphia 43, Pa.*

Class H insulation is now available as an optional feature of some of this company's network protectors. The new insulation is said to make possible overloading from 31 to 46% above the network transformer's full load current rating with minimum loss of life. Available on protectors rated 1,600, 2,000, 2,500 and 3,000 amp, 216Y/125V; and 3,000 amp at 480Y/277V.

Multistator Meter

(6) *Sangamo Electric Co., Springfield, Ill.*

The Sangamo type P2S network meter is the initial development of a complete new line of polyphase watt-hour meters. All socket-type two-stator meters will have improved electrical and mechanical characteristics and extended load range resulting from the use of a slow full load speed of 8 1/3 rpm. A reduction in height permits the use of the single-phase cover. The company reports that accurate registration without special calibration is provided for circuit variations from 42% to 125% of rated voltage.

Cutter-Plier Tool

(7) *Thomas & Betts Co., 36 Butler St., Elizabeth, N.J.*

A new two-in-one hand tool introduced by this company performs both as a wire cutter and as installation pliers for self-insulated Sta-Kon terminals. The skinned wire is inserted into the terminal and staked with the new tool. The resulting connection is said to terminate the wire electrically, mechanically grip the insulation and is completely insulated.

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FEATURING QO—FINEST BREAKER EVER BUILT

2 THROUGH 42 CIRCUITS

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MAIN BREAKER

SERVICE ENTRANCE DEVICES...SPLIT BUS

- No "call-backs"
- Eliminates nuisance tripping
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- Indicates tripped circuit
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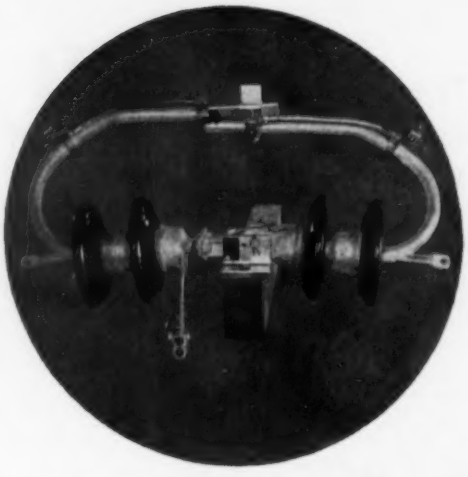
- Meets Federal Specifications WP-131A Class A
- Double poles UNLIMITED. No space penalty
- Silvered plug-in connections equal to best bolted construction
- Box lugs on all terminals, line, load and neutral
- Door is standard on 12 circuits and larger devices
- Flush, Surface or Raintight

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!

SQUARE D COMPANY

You can install KPF switches more quickly, at less cost, than any comparable switch. Just bore six holes in a single cross arm, mount, and connect. No precision requirements, no temperamental mechanism to bind, freeze, malfunction or need lubrication. Just simple, cleanly designed parts, arranged in a rugged, foolproof manner for trouble-free operation. The economy and dependability of KPF switches has been proved on major utility systems for almost 50 years.



install in the air — or on the ground

Mount phase units individually to pre-installed cross arm on the pole top.

Assemble complete switch on the cross arm before arm is installed on pole.

Mount switch and cross arm on pole, then tilt pole into position.

Details in complete catalog. Why not order test installation?

KPF ELECTRIC COMPANY
Dept. W, 1624 E. Alpine Avenue
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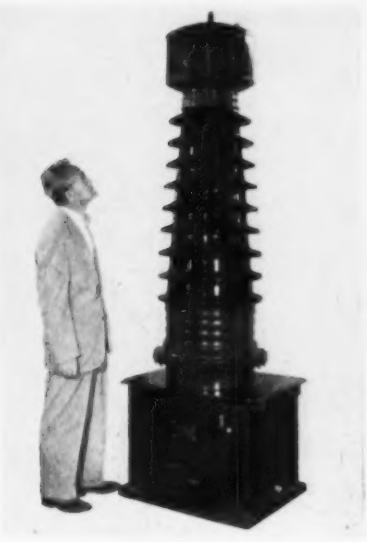
KPF
AIR BREAK SWITCHES
Standard for nearly half a century



H-V Potential Transformer

(8) *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

A new line of high-voltage potential transformers announced by this manufacturer is said to feature reduced cost, size and weight. It is a single core and coil unit with a single bushing and is available in voltage classes from 92 to 161 kv. Although smaller and lighter than previous designs, it is said to meet all ASA standards for high-voltage metering and relaying.

Wiring Troughs

(9) *Wadsworh Electric Mfg. Co. Inc., Covington, Ky.*

Two new sections have been added to this company's line of 4x4-in. wiring troughs. The sections, one 20 in. long and the other 30 in., have concentric knockouts that are 10 in. on center. Knockouts can be ½, ¾, 1 and 1¼ in. diameter. Sections come with sealable screw-on covers. Another line being announced is an 8x8 in. in 1-, 2-, 3-, 4- and 5-ft sections with fittings.

Lift Truck Platform

(10) *Yale Materials Handling Division, Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa.*

A workman's platform and boom attachment for industrial lift trucks is available from this company. Designed to fit on a standard fork carriage, the platform is intended for electrical maintenance or other overhead jobs.

Plastic Battery Jars

(11) *Exide Industrial Division, Electric Storage Battery Co., Box 8190, Philadelphia 1, Pa.*

This company is now using polystyrene plastic jars to increase the rated capacity, assure leakproof jar construction and increase electrolyte volume of batteries in its line for use in utility, telephone, railway, emergency lighting and industrial plant operations. Two series of batteries are rated from 415 to 996 amp-hours and 496 to 1,173 amp-hours, respectively.

Mailing Machine

(12) *Inserting & Mailing Machine Co., Phillipsburg, N. J.*

Development of a two-station inserting and mailing machine for utilities and other companies is announced by this company. Smaller than the average office desk, the machine performs eight operations in a continuous sequence. It gathers enclosures, open flaps, stuffs, moistens, seals, prints indicia, counts and stacks with only one operator. The manufacturer says it can turn out 6,000 pieces an hour.

White Mercury Lamps

(13) *Large Lamp Department, General Electric Co., Nela Park, Cleveland 12, Ohio*

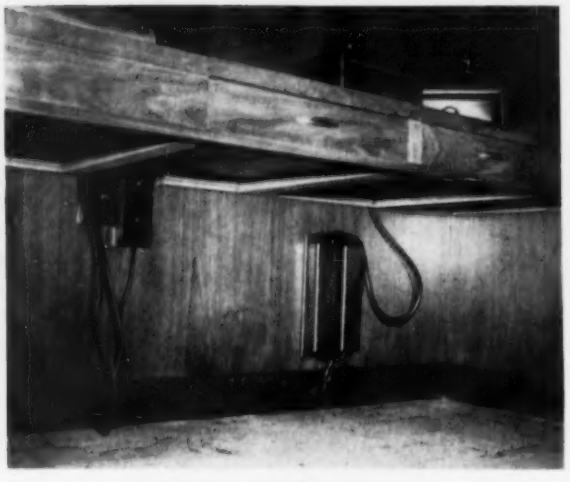
Four new 1,000-w mercury lamps that provide nearly 5% more light than previous lamps of this type have been announced by this company. Increased efficiency was achieved with application of a special phosphor as an internal coating to four models of the 1,000-w bulged tubular shaped lamps.

"EFFICIENCY" is the word from Southern Nevada Power Co. as it utilizes this HC Boring machine manufactured by the Highway Trailer Co., Edgerton, Wis. The utility encounters some tough terrain in its service territory, and the boring machine in combination with a Four-Wheel-Drive D-type power take-off does the job. The truck is also used for water tank, compressor and tamping equipment power

Splicing-Terminating Tape

(14) *Okonite Co., Passaic, N. J.*

Made of an entirely new formula, this new tape is designed for splicing and terminating either plastic or rubber cables. For connections under 2,000 v it serves as both insulation and sheath so no other tape is required. It comes in five colors for phase and circuit color coding. Upon application the new tape fuses into a solid, homogeneous wall around the connection. It is UL listed for use as sole insulation and covering of joints and splices in electrical conductors.



Surface Raceway System

(15) *National Electric Products Corp., Gateway Center, Pittsburgh, Pa.*

This baseboard level surface raceway system was designed to provide for high and low potential wiring for power, light, telephone and intercommunication facilities. It is said to satisfy present wiring needs, permit easy access to raceways when meeting future demands, and assures a neat appearance. Economical lay-in wiring is used. The system accommodates up to 10 No. 6 AWG type TW conductors and either 50 twisted pair telephone wires or several 26-pair telephone cables.

Scale Models Show Transformer Design

Scale models have solved the problem of conveniently showing the intricate design of large Allis-Chalmers transformers. Patricia Forsythe of Allis-Chalmers demonstrates how easily a transformer model can be taken apart for detailed inspection

Borer Spotter Base

(16) *Highway Trailer Co., 405 E. Fulton St., Edgerton, Wis.*

A spotter base to position earth boring unit faster and easier during digging operations is announced by this company. It is said to eliminate the necessity of constant maneuvering of the truck to position for the hole-digging or pole-setting operation. Finger-tip-controlled hydraulic positioning allows the operator to move the machine within an arc of 80° and extend the unit 22 in. from the platform.

For Additional Information Fill in the Coupon on Page 33

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1 mile of *Ceiling Beauty* doing double duty

both lighting and air conditioning from one fixture!

These new double-duty fixtures bring a new freedom to creative architecture. Gone is that discord of fixtures and air outlets! Instead: clean-lined, uncluttered ceiling beauty. Air outlets are engineered right into the lighting system! Result: greater economy, comfort and ceiling beauty. No double installation problems . . . improved draft-free air diffusion . . . modern, well-diffused, high efficiency Benjamin troffer lighting. Free illustrated brochure brings you the whole fascinating story of this new 2-in-1 fixture. Write: Benjamin Electric Mfg. Co., Dept. J, Des Plaines, Ill.

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Multi-Vent® Air Diffuser by Pyle National Co. • Trofferlite by Benjamin Electric Mfg. Co.

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...always the source of good lighting

THAT NEW KID IS NOW WEARING SPIKES!

Although a relatively new manufacturer in the adjustable metal framing industry, ITECO already has secured its future by being ready to offer services the others won't or can't perform.

ITECO is a prime source for the electrical industry throughout the West. It makes, stocks and catalogs over 500 framing fixtures and fittings as well as stocking a big inventory of wireway-support channel ready for delivery.

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New 28 page catalog, yours for the asking!

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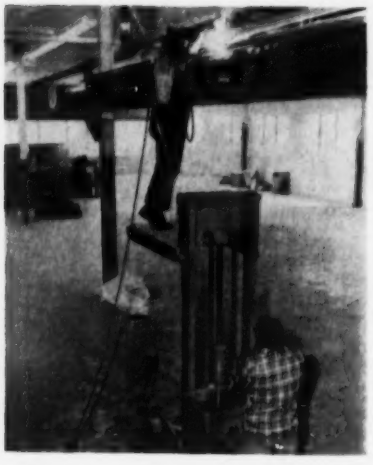
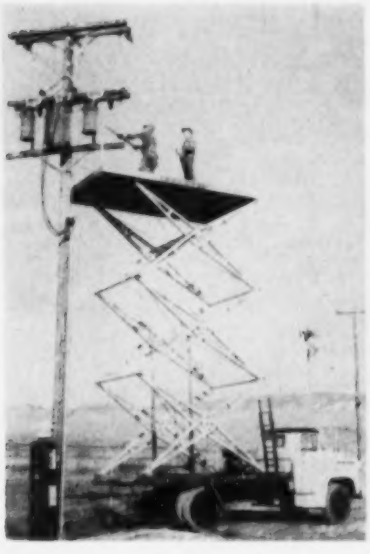


Contractors installing the insulated electrification for a crane system in the new Yale & Towne Mfg. Co. plant in San Leandro, Calif., estimate a 40% saving in labor was achieved by the use of a Yale Worksaver. It took a day and a half to install 350 ft of trolley duct, working from the 4,000-lb capacity truck

Mercury Lamp Transformers

(17) *Jefferson Electric Co. Bellwood, Ill.*

A new line of unity power factor mercury lamp transformers for series circuits is announced by this manufacturer. The company reports that the transformers, coupled with a "new concept of application," provide a new technique in system engineering that makes possible 50% more lamps per constant current regulator. Each lamp requires 33% less regulator capacity, it is stated. The transformers are designed for use on 10,500-v circuits or less.



Elevating Platform

(18) *Hydro-Point Engineering Co., Hamilton, Mont.*

As many as three men can work at the same time on this new 8x14-ft elevating platform. An additional feature is that one stop covers more area and reduces positioning. There are six models of the platform available, all with a working capacity of 1,000 lb. Extended heights vary from 15 ft 8 in. to 70 ft 8 in., depending on the model. Hydraulic control is said to give smooth action and positive positioning at any desired working height.

Liquid-tight conduit

(19) *Columbia Cable & Electric Corp., 255 Chestnut St., Brooklyn, N. Y.*

This manufacturer is producing a new liquid-tight, flexible electrical conduit for installations as outlined in Article 251 of the National Electrical Code. It is UL listed for these applications. The conduit consists of a flexible galvanized steel conduit with a copper bonding strip wound spirally in the spaces between the convolutions, and is covered with an extruded vinyl plastic sheath. It is also available without the bonding strip.

FRANKLY, IT HAS BEEN IMPOSSIBLE TO IMPROVE THE EXCELLENT CONTACTS OF EAGLE RECEPTACLES WHICH HAVE BEEN PROVEN FOR OVER 25 YEARS.

But Now . . .

EAGLE Presents Them With The

NEW LOOK

Modern Design —
No Grooves To Catch Dust!

AND

☆ LARGER HEAD BINDING SCREWS for wire fastening

AND

☆ MUCH STURDIER BAKELITE BODY to withstand the heavier demands of modern wiring

AND

☆ ⅞" LONG MOUNTING SCREWS attached to strap

Underwriters' Listed
Approved for use on
REA SYSTEMS &
PROJECTS
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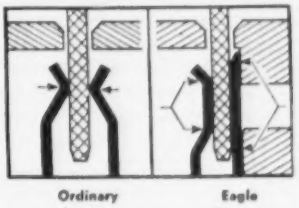
EAGLE Now Also Available with
HEAVY DUTY DOUBLE-WIPE CONTACTS



Ordinary Contacts — Eagle Contacts

Ordinary double-wipe contacts make contact at only 2 places. Eagle Exclusive double-wipe contacts incorporate the Eagle pressure principle to assure maximum contact area with the prong. Note large areas of contact between prong and flat surfaces of double-wipe contacts, backed up by plastic at top and bottom.

SINGLE CONTACT DUPLEX RECEPTACLES
No. 733 without plaster ears
No. 736 with plaster ears

DOUBLE-WIPE DUPLEX RECEPTACLES
No. 977 without plaster ears
No. 978 with plaster ears

All available in Brown or Ivory
Note—#978 Also meets Fed. Spec. WR 151A

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FOR TWO 48", T-12, 38W SLIMLINE LAMPS OR
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ADVANCE® Service Stocking Distributor Plan

Makes Fluorescent Lamp Ballast Servicing Simple . .

The ADVANCE Fluorescent Lamp Ballast Servicing Plan saves time and money for electrical contractors, lighting equipment manufacturers, engineers, electric utilities, architects and users of fluorescent lighting equipment. To serve you in this program ADVANCE, the world's largest exclusive ballast manufacturer, has appointed a nationwide network of service-stocking distributors. These authorized distributors carry a complete stock of ADVANCE ballasts and will replace, WITHOUT CHARGE, any ADVANCE ballast which becomes inoperative within the two-year warranty period. From this ADVANCE stock, which includes ballasts to operate all fluorescent lamps, you can also get immediate replacement service for any other make ballast.

The new ADVANCE Buyer's Guide, the Cross-reference Fluorescent Lamp Ballast Replacement Chart together with the newest brochure listing authorized ADVANCE Service-Stocking Distributors will be sent to you without cost or obligation. Write today!

ADVANCE QUALITY Fluorescent Lamp Ballasts are packaged in modern individual cartons that put an end to loose dangling lead wires, prevent damage to lead wire and assure you of factory fresh ballast stock always. End labels on the new individual cartons permit instant identification of ballast type, catalog number and pertinent electrical characteristics.

The ADVANCE label is assurance of dependable, efficient performance at lowest cost . . . the result of years of engineering and development that have made ADVANCE fluorescent lamp ballasts "The Heart of The Lighting Industry".

ADVANCE
World's Largest Exclusive Manufacturer of Fluorescent Lamp Ballasts
TRANSFORMER CO.
2950 NO. WESTERN AVE. CHICAGO 18, ILL. U.S.A.

The Heart of the Lighting Industry

BULLETINS ETC.

(20) **DRAFTING SHORTCUTS** — Frederick Post Co., 3650 N. Avondale Ave., Chicago 18, Ill., has compiled a booklet showing 59 ways to speed drafting and computation work. The booklet, composed of ideas given by experienced engineers and draftsmen, is said to show new approaches to old problems.

(21) **TRANSFORMER APPLICATIONS** — Bulletin GEA-6617 of General Electric Co., Schenectady 5, N. Y., shows how standard design medium transformers can be applied where a special unit seems to be required. Eight application areas for units of this type are given.

(22) **WHITEPRINTERS** — P&H Sales Corp., 5640 N. Western Ave., Chicago 45, Ill., is offering Bulletin 5782 which illustrates and describes the company's high production dry process whiteprinters. The model described is a 44-in. unit with synchronized printing and developing speed up to 14 ft per minute.

(23) **SELF-PROTECTING TRANSFORMER** — Construction and design features of Allis-Chalmers self-protecting transformers in ratings 3 kva through 100 kva, 15 kv and below, are covered in a new bulletin released by the company. Write to the company at Milwaukee 1, Wis. Ask for 61B7309C.

(24) **TRANSFORMER CONNECTORS** — Various types of internal connectors used in modern distribution transformers and common types of high- and low-voltage external connectors are given in two volumes of "Kuhlman Kurrents" available from Kuhlman Electric Co., Box 288, Birmingham, Mich.

(25) **CAPACITOR EQUIPMENT** — A trend to auto-switched capacitor equipments for distribution circuits is discussed in this new 12-page booklet. Equipments and control devices available are described. Ask for GEA-6543 from General Electric Co., Schenectady 5, N. Y.

(26) **DUPLEX TRANSFORMERS** — A complete line of duplex-type pole-mounted transformers is the subject of a new eight-page booklet published by Pennsylvania Transformer Division, McGraw-Edison Co., Box 330, Cannonsburg, Pa. The booklet describes and illustrates design and construction details and includes mechanical and electrical data for transformers from 20 through 100 kva with voltage ratings from 2,400 through 13,200 v. Ask for Catalog 1757.

(27) **HYDRAULIC TURBINES** — A new 48-page bulletin describing the three principal types of hydraulic turbines has been released by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The bulletin's partial list of units includes some of Allis-Chalmers' largest installations in each category with cross sections and other engineering information. Ask for Bulletin 02B7301A.

(28) **FEEDWATER HEATERS** — A two-color, 16 page bulletin on feedwater heaters has been recently published by the Griscom-Russell Co., Massillon, Ohio. Bulletin 300 outlines the use of feedwater heaters, their economies and some of the problems of design.

(29) **ELECTRICAL HOUSINGS** — Spring City Electrical Mfg. Co., Spring City 26, Pa., announces the availability of a new catalog of junction and pull boxes, conduit boxes, hinged cabinets and explosionproof housings. Ask for Catalog 10.

(30) **STRINGING EQUIPMENT**—Blocks, sheaves and crossarm rollers for stringing electrical conductors are illustrated and discussed in a new catalog available from Sherman & Reilly Inc., Chattanooga 2, Tenn.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after January 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

STANDARD ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

FIRM ELKO LAMOILLE POWER CO.
Elko, Nevada

RPM DELO Oil holds wear to .003″ in 9,791 hrs.

In initial operation, this 2,045-hp Enterprise diesel lubricated with RPM DELO Oil ran continuously for 9,791 hours. Average wear on engine's eight 17" diameter cylinders was just .003"! Plant Manager Hugh Liparelli says, "Frankly, the clean condition of the pistons and liners surprised me. I expected them to be coated with varnish, but instead we found them bright and shiny. The engine looked as if it had only run about 2,000 hours. There were no stuck rings, no engine deposits of any kind." The engine drives a 1450 KW generator at Elko Lamoille Power, went into service in 1954.

Hilco oil filter for Enterprise diesel operates whenever engine is running, helps keep oil clean, permits longer continuous operation. RPM DELO Oil, the only lubricant used in this engine, is also used in cylinder lubricators of station's five other diesels. Elko Lamoille Power Co. has used RPM DELO OIL since its introduction.

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming.

For More Information on this or any other petroleum product contact your Standard Engineer or representative, or write 225 Bush Street, San Francisco 20, California.

LUBRICATING OILS RPM DELO

TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

OCTOBER 1957

ELECTRICAL WEST SALES GUIDE

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

Restyled line shown in the West

The Shape of Things to Come—All over the West last month Westinghouse was showing its restyled line of major appliances and everywhere dealers were enthusiastic. A completely new line, styling was to make the appliances "fit in to look built-in," without design clash between older and new items. The homeowner has had a voice in the design—some of the features are frankly "what the housewife has been asking for." Among these are a true freezer in the combination models; adjustable and removable refrigerator shelves; tubular heating units in ovens; plug-outs in all surface and oven units; recessed tops on every model. A rheostat on the heat controls allows unlimited choice of settings, and there is an automatic surface unit. A truly portable dishwasher holds a complete dinner service for eight. TV models have the new 110° picture tube; in addition feature automatic tuning for both picture and sound. The appliances come in the confection colors. Available also are interchangeable wood and color panels to fit in with kitchen design. A clever Shape of Tomorrow symbol to be used in advertising combines the angular side-view of control panels; modular design; silhouette of refrigerator cabinets; the Circle W trademark.

This is "selling"?

Closeout—When a prominent contractor-dealer in the Bay area decided to quit fighting the appliance jungle, he advertised a big closeout sale to get rid of his stock, offering to sell at 10% above cost. Interestingly, the manufacturers' distributors of several national lines sent men down quicklike, not to protest but to offer him all the white goods he could take at their cost in order to unload.

Take TV in L. A.

TV Viewers—According to a report issued by Glen Logan, managing director of the Electric League of Los Angeles, there are more than 2,800,000 TV sets in the Los Angeles viewing range. Of these, more than 9,000 are color units.

Go modern

The newly formed kitchen modernization committee of the San Diego Bureau of Home Appliances has elected Oliver Schutte of Modern Kitchens as chairman and Bill Young, Morrison Supply Co., as vice-chairman.

Electric heat takes hold

Washington Water Power's electric heat promotion is going forward, according to Gordon DeFoe, sales manager. Early last month there were nearly 1,000 jobs completed, running 10 to 12 kw each. DeFoe was in New York in mid-September to attend Ebasco's sales conference and take part on the electric heat panel.

Concerted effort

WWP will break a new promotion of laundry equipment in October. It includes cooperative advertising and concerted sales effort by all outlets for one week in October and again for a week in November. The utility will buy the headline of each ad, under which the distributors, 13 of them, will run product advertising. Dealers will tie in with their ads on prices and terms. Idea is to get all outlets to talk about the same thing at the same time. A unique feature of the promotion is the daily drawing for a prize of five shares of Water Power common stock.

Sells modern living

Puget Sound Power & Light Co. has a new monthly publication for home builders, architects, electrical contractors and appliance dealers in its sales area. Called Puget Power Lines, it carries information on home building, with emphasis on "modern living . . . electrically."

17,300 were counted

Portland GE's 1957 Idea Home has closed a successful 30-day showing. Nick Mason, the company's "eye" on this job, reports that the electronic eye he installed in the home's doorway ticked off 17,300 persons. Bob Hemstreet, the builder, sold four homes just like it, two others similar to it and two six-plexes. Hotpoint sold many appliances including the electronic oven installed in the model home.

Fair winners

Winners at California State Fair—Pacific Gas and Electric Co. took first place honors in the appliance and home products division with General Electric's Live Better...Electrically caravan. (See EWest, September p 129.) General Electric Appliance Co. placed second. In the commercial classification Sacramento Municipal Utility District was top award winner with RCA-Whirlpool's Miracle Kitchen.

Bureau officers

Sam L. Hall, Electric Supplies Distributing Co., has taken office as president of the San Diego Bureau of Home Appliances to serve until next Sept. 1. William Marsden of Marsden's is first vice-president and Ben Jacobson, Cabrillo TV & Appliance, the second vice-president. Jerry Heilbron, Heilbron Electrical Co., is the new treasurer, replacing Hall. Hall, who has been a member of the bureau's board of directors since its organization, replaces Ed Nystrom of Nystrom Brothers Co., who remains on the board as immediate past president.

Salinas Home Show

Salinas Valley Gas and Electric Appliance Dealers Assn. will hold its third home show on Oct. 9 and 10. The association sells 30 exhibit spaces in the auditorium to appliance dealers and others in the home supply and equipment business. Booth action as well as an effective display are required of exhibitors. Each dealer in the show contracts to run 80 column inches of advertising supporting it and to contribute a $50 prize to be given from the stage. Last year over $15,000 worth of business was done on the floor alone.

Boosting color TV

Ward Terry & Co., RCA distributor for the region with headquarters in Denver, is launching an ambitious program to boost color TV sales. Bob Barnes, advertising manager, said the current campaign, started Sept. 20 and continuing through October, "is the biggest ever. The effort is at least three times greater than last year." Dealers joining the RCA promotion are stressing free home trial. "We know we can close deals in from 60 to 70% of the cases where there are home trials," Barnes said. "The biggest problem," he said, "is that only 25% of the persons in the area have seen color TV."

Distribution center

One of the busiest men in Denver the past month has been H. C. Davis, the new district manager for the appliance & television department of G-E Supply. Davis is in charge of establishing a new distribution center to serve major appliance and TV dealers in the Denver and Albuquerque markets. On Nov. 1 G-E is taking over the distributorships formerly handled by B. K. Sweeney Co. of Denver and Electric Supply Co. of Albuquerque. Davis goes to Denver from Dallas, where he was regional manager of the Appliance & Television Division of General Electric Co. G-E is remodeling a warehouse at 5390 E. 39th Ave. in northeast Denver that was formerly occupied by Caterpillar Tractor Co.

People

Clint Gage has been brought into the Los Angeles office of Gough Industries to direct appliance sales for all branches of the company. He was formerly the appliance manager at Bakersfield. New manager of Gough Industries at San Diego is Jim Smith. He was formerly with the organization at Los Angeles. . . Robert M. Oliver, vice-president in charge of marketing for Thomas A. Edison Industries, has resigned to form his own marketing counseling service, with headquarters in Phoenix. Before joining Edison he was manager of the Westinghouse Portable Appliance Division. He also has been with Landers, Frary & Clark and with Proctor Electric. . . J. N. Ceazan Co. has appointed L. Dale Cunningham manager of its San Diego branch with headquarters at 1945 E. Harbor Drive.

Frank Falge's monthly progress report on

LIVE BETTER . . . *Electrically*

Kwh sales decelerating

Residential load growth, which was accelerating in 1956, has slowed down following appliance sales. Some utilities that upped their promotion in 1957 have continued to accelerate, with increased appliance sales as well.

What price hot water?

A number of Western utilities have joined the majority in recognizing the importance that plenty of hot water, quick, plays in modern living; have approved and are enthusiastically promoting the smaller, less expensive fast-heating, quick-recovery type of water heater. Utah P&L, for example, helped to sell 3,375 water heaters the first six months of this year compared with only 2,158 in 1956, a 56% gain. WWP reports that 9 out of 10 homes built in the Spokane area since Oct. 1, 1956, have installed or are installing electric water heaters.

Load gains

Your reporter recently moved into an apartment in San Francisco. A quick check shows the lighting was upped from 565 w to 2,280 and a freezer and dishwasher made further load increases, not to mention electric skillet, mixer, sun lamp, etc. Apartments can help to build load and sales.

Now an electric baby sitter

An Electronic Nurse is offered by the Mark Simpson Mfg. Co. Inc., 32-28 49th St., Long Island City 3, N. Y., and in baby blue. Here's a boon to tired mothers. . . Oh, yes, Montgomery Ward gets aboard, too. In its fall catalog is listed an electric vibrating easy chair. . . Hydromatic Convertible, 1300 Northwestern Bank Bldg., Minneapolis 2, Minn., offers a bed that unfolds and folds up again at the touch of a button.

Automation for the home

Automation in the home by tape recording may soon be with us, according to Life. If so, "you will set up the entire family schedule for the next day on magnetic tape, push a few buttons, check instruments and go to bed. The robot housekeeper will shut the windows, rouse you with a soft stereophonic air, start the coffee maker and the toaster, open the garage doors, start the car, handle such chores as turning up the heat during the day, prepare dinner, set off the electric dishwasher, switch on the TV set to your favorite program and quietly play 'Goodnight Sweetheart' while putting out the cat. . ."

WHY WORRY about aluminum or bi-metallic connectors?

DO THIS ▼▼▼

1. Wire brush conductors with a...

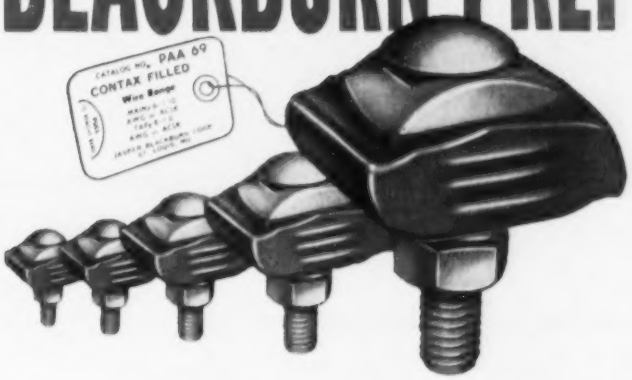
BLACKBURN WIRE BRUSH

with exclusive GLOVE GUARD

- Exclusive guard prevents glove puncture
- Easy grip handle and guard completely covered with durable thermo-plastic coating
- Brush elements can be rotated and are replaceable
- Number WBH-2 furnished with hot line tool adaptor
- Competitively priced

2. Use...

BLACKBURN PREFILLED CLAMPS



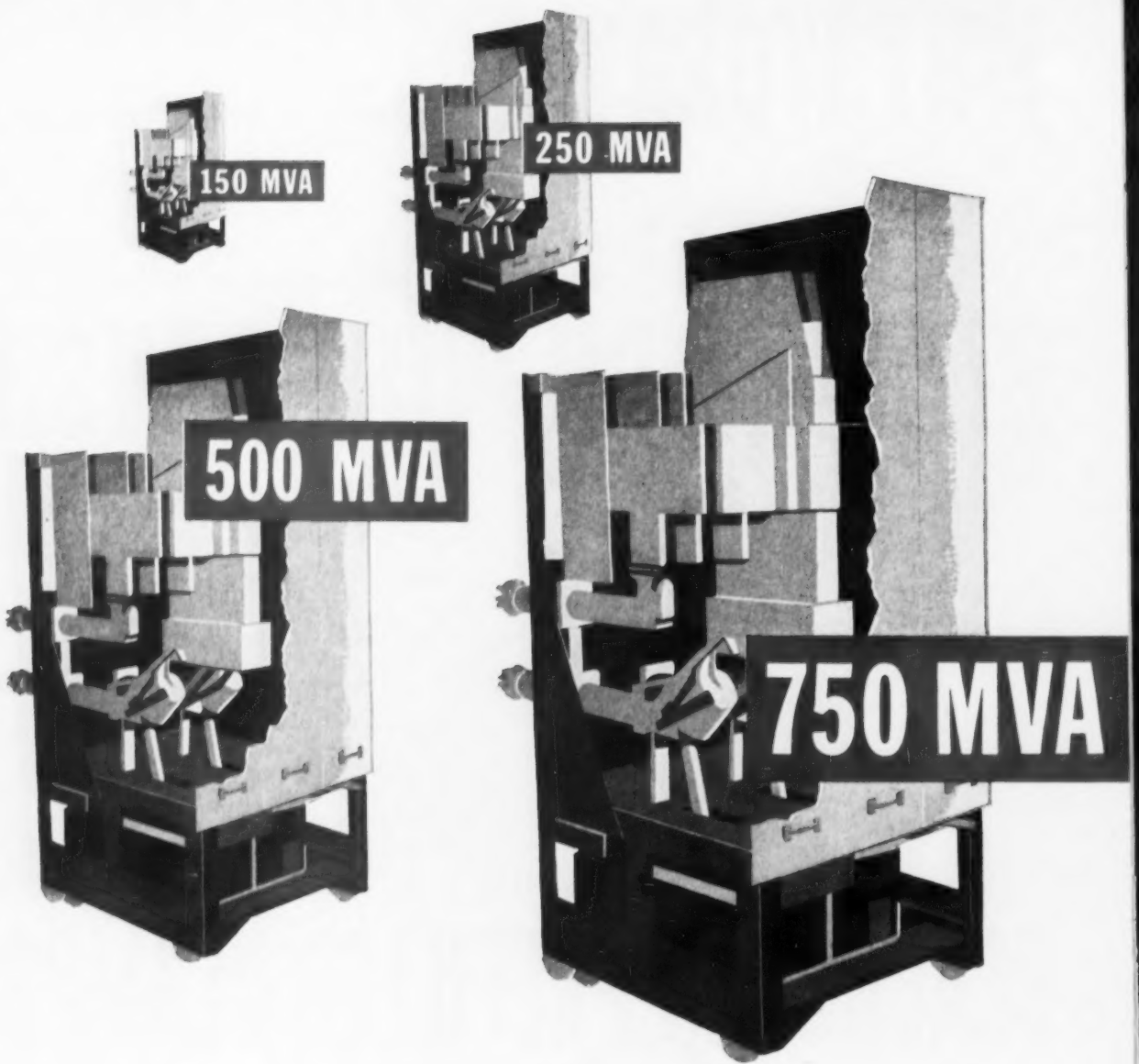
PAA, PAC and PGP LINES

Contax liberally applied to each groove at factory, then sealed in. Catalog number and wire range printed on tag. Just wire brush conductor—pull tear string—cover drops off—clamp ready to install. Blackburn Prefilled Clamps save installation time—give you positive assurance compound is always applied to connections.

Available through electrical wholesalers everywhere

JASPER BLACKBURN CORPORATION

1525 WOODSON RD., ST. LOUIS 14, MO., WYDOWN 3-9430



Westinghouse paces industry
by introducing the

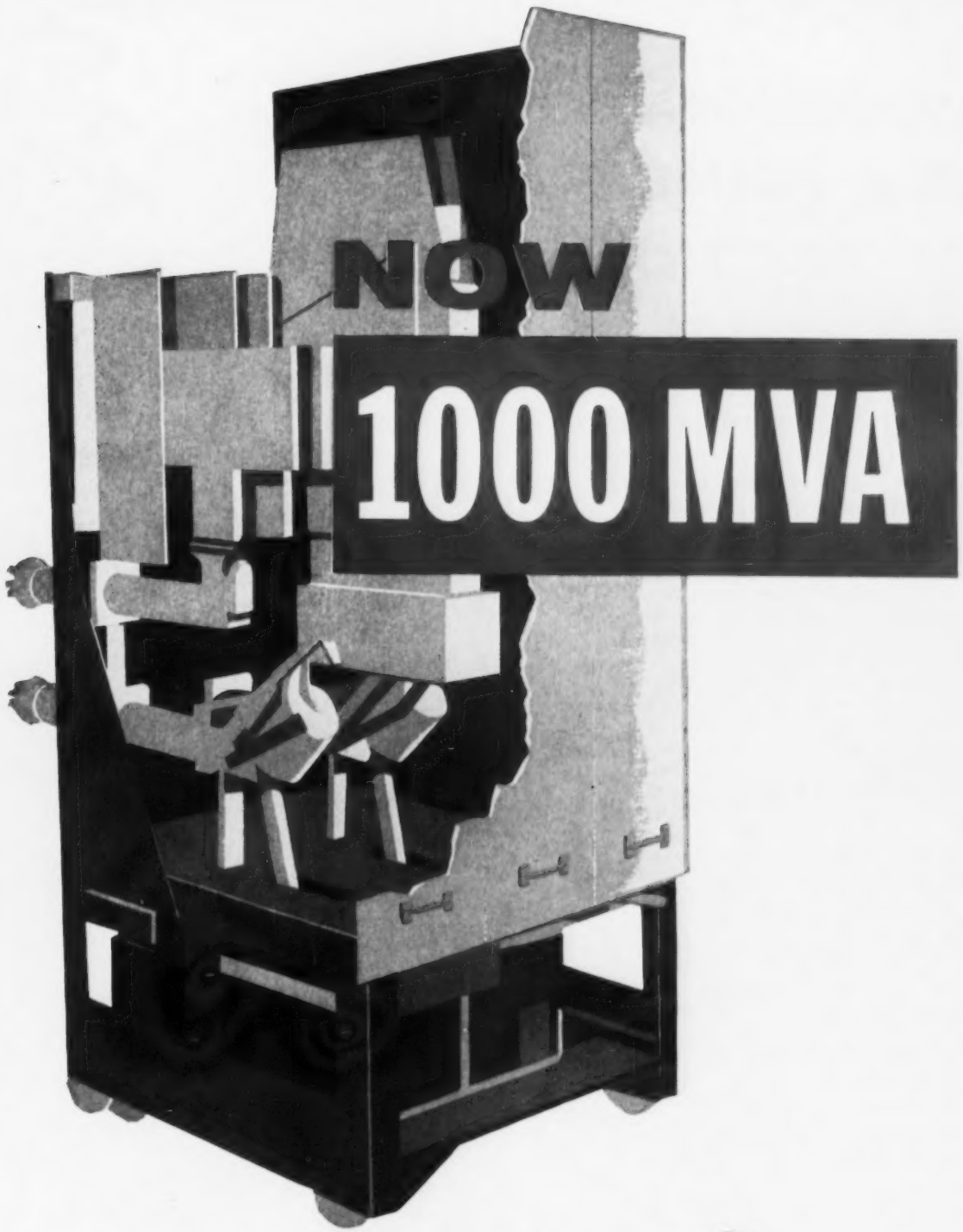
WORLD'S FIRST MAGNETIC CIRCUIT BREAKER TO INTERRUPT 1 MILLION KVA FAULT

1200 and 3000 continuous ampere capacity

The time-tested and proven design of the De-ion principle of circuit interruption has again lent itself to increased capacities. Westinghouse engineers, constantly aware of your needs, have now adapted the De-ion principle to the new 150 DH 1000 breaker that interrupts faults up to the magnitude of 1 million KVA . . highest magnetic breaker interruption capacity in the industry!

WHAT THIS MEANS TO YOU: It means you'll be better able to handle larger loads—safely—in large metropolitan generating substations. It means, too, that greater economy will be realized in utility and industrial substations of high capacity

J-60926



YOU CAN BE SURE...IF IT'S Westinghouse

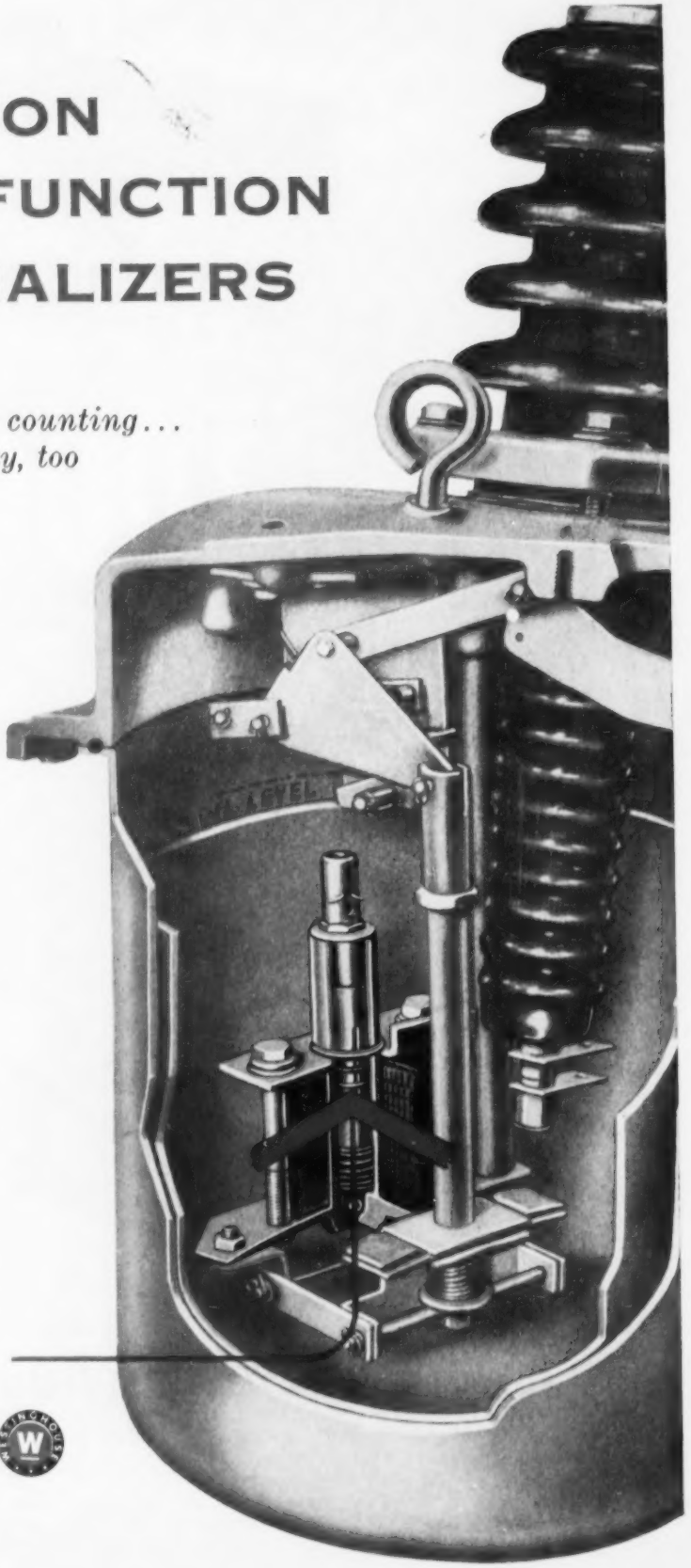
COORDINATION IS A PRIME FUNCTION OF SECTIONALIZERS

Only Westinghouse gives you absolutely precise counting... and greater current capacity, too

By definition, a sectionalizer is an automatic switch which works in conjunction with power circuit breakers and reclosers to isolate local, permanent faults and thereby protect system service continuity. Its ability to coordinate with breakers and reclosers is therefore a paramount factor in evaluation.

Westinghouse sectionalizer coordination is positive. The Westinghouse sectionalizer will carry more than 50% greater current, continuously, and will accept momentary loads up to 6500 amperes. The Westinghouse Type GRS line is the most complete—nine current steps from 5 through 140 amperes—and voltage ratings to 15 kv.

Complete details are available from your Westinghouse sales representative. Also, you may write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, for reprint No. 5090, an application and engineering AIEE paper on sectionalizer coordination concepts. J-60923



Consistent and accurate counting is assured by the patented magnetic rings in the integrator mechanism. During operation, the brass integrator piston is locked in each counting position by the magnet plate on top of the series coil.

YOU CAN BE SURE...IF IT'S

Westinghouse

E.F. Luna: ~~Please note and return~~

ELECTRICAL TESTING LABORATORIES, INC.

2 EAST END AVENUE, NEW YORK 21
BUTTERFIELD 8-2600

TESTING • INSPECTIONS • CERTIFICATION

ELECTRICAL • PHYSICAL • CHEMICAL

July 17, 1957.

Mr. E.L. Gittleson,
Manager of Quality Control
Anaconda Wire & Cable Company
Hastings-on-Hudson 6, New York

Dear Mr. Gittleson:

Herewith is our Summary Report No. 366064 for 1956-1957, which brings together the results of the services we have rendered to your Company in this thirteenth contract year under your Quality Maintenance Program. As usual, our service covered your seven plants from coast to coast and consisted of the following:

1. Check or "audit" of inspection records at each plant, with results of some 121,500 tests examined. As in other years, every evidence that substandard material was rejected and so labelled, while only material in full compliance with relevant specifications went to the shipping room.

2. Witness of testing operations in each plant, with no criticism of technique, procedure or applicability of specification. As a "double check" - to our headquarters and tests made there by our personnel, with our equipment and our interpretation of specifications; result, satisfactory agreement.

3. Specimens of products on which plant tests had been witnessed were shipped throughout. 352 pieces of testing equipment, some with as many as 5 ranges each, were checked; our certificate reports covered 366 pages. A fresh "ETL" red label was attached to each to indicate compliance with the accepted accuracy limits.

4. Calibration of all testing apparatus in the seven plants using ETL standards

To summarize in one sentence: All of this checking by ETL furnishes once more, evidence of the effectiveness of your in-plant Quality Maintenance Program to insure that the products shipped are in full compliance with the relevant specifications.

Very truly yours,

Gordon Thompson

Gordon Thompson,
Chief Engineer.

GT/eg

E.L.G. Thanks - This certainly confirms that Anaconda Wire and Cable is made under the strictest quality control program in the industry

E.F.L

NOTE: E T L REPORTS ARE THE PROPERTY OF THE CLIENTS TO WHOM THEY ARE RENDERED. [illegible] REPRESENTATIVE CHARACTER OF THE SAMPLES AND TO THE COMPREHENSIVENESS OF THE TESTS. [illegible] QUOTATIONS FROM E T L REPORTS ARE AUTHORIZED ONLY SUBJECT TO [illegible]

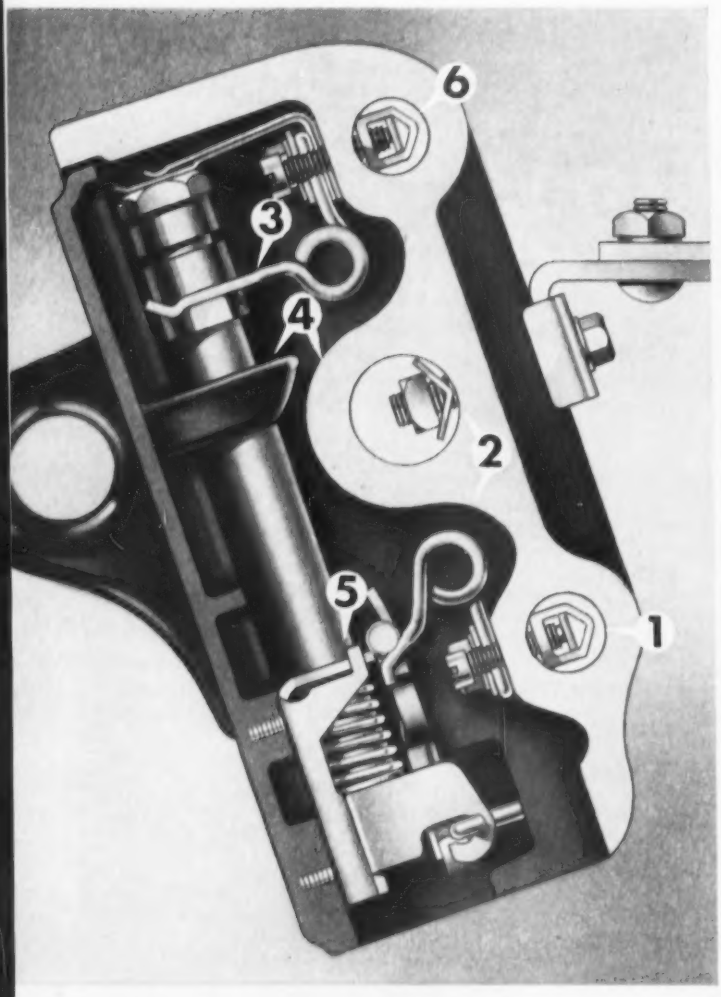
57423

These are the cutouts linemen prefer...

KEARNEY TRIPOMATIC

ENCLOSED CUTOUTS

Check these KEARNEY Tripomatic features . . . each developed and tested to provide the most dependable protection for your distribution equipment.



1. A porcelain wall *isolates* lead-in holes for back connected terminals from the cartridge chamber.
2. Parts fastened with bolts extending through housing . . . cemented attachments eliminated. Contacts and hanger bracket *can't* loosen or pull out of housing.
3. When fuse link blows, resilient spring contacts absorb impact of tube recoil, preventing shock damage to entire cutout. Since the contacts *remain* in adjustment, high contact pressure is maintained even after long service.
4. Engineering of box interior and the collar around the tube restricts gas movement from lower to upper contact. Internal short circuits are prevented.
5. Positive dropout through spring backed toggle mechanism.
6. Fully plated stirrup type terminals. 50 amp. cutouts take No. 2 str.; 100 amp. ratings take No. 2/0 str.

FIELD-TESTED—At KEARNEY's Substation Laboratory of 150,000 KVA Transformer capacity—with a back up power of 445,000 KVA—all equipment is tested under rigorous field conditions. KEARNEY Certified Ratings are actual, proved performance ratings . . . not just theoretical calculations.

for BETTER CONSTRUCTION
SAFER MAINTENANCE

Specify

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. EVELETH, ONT.

The Mark of Quality

KEARNEY PRODUCTS

they're easiest to fuse...

No nuts, no bolts to tighten! Exclusive construction of the KEARNEY Tripomatic makes it the fastest, easiest cutout to fuse.

Here's how simple it is:

Thread standard buttonhead fuse link through cartridge, and tighten cap . . .

Snub the fuse link cable *over and around* the toggle . . .

Pull cartridge back against its stainless steel spring until toggle arm drops in place over lug, locking fuse cable in place. Mechanical breakage is prevented because correct tension is placed on every fuse link!

JAMES R. KEARNEY CORPORATION

General Offices: 4224-42 Clayton Ave., St. Louis 10, Mo.

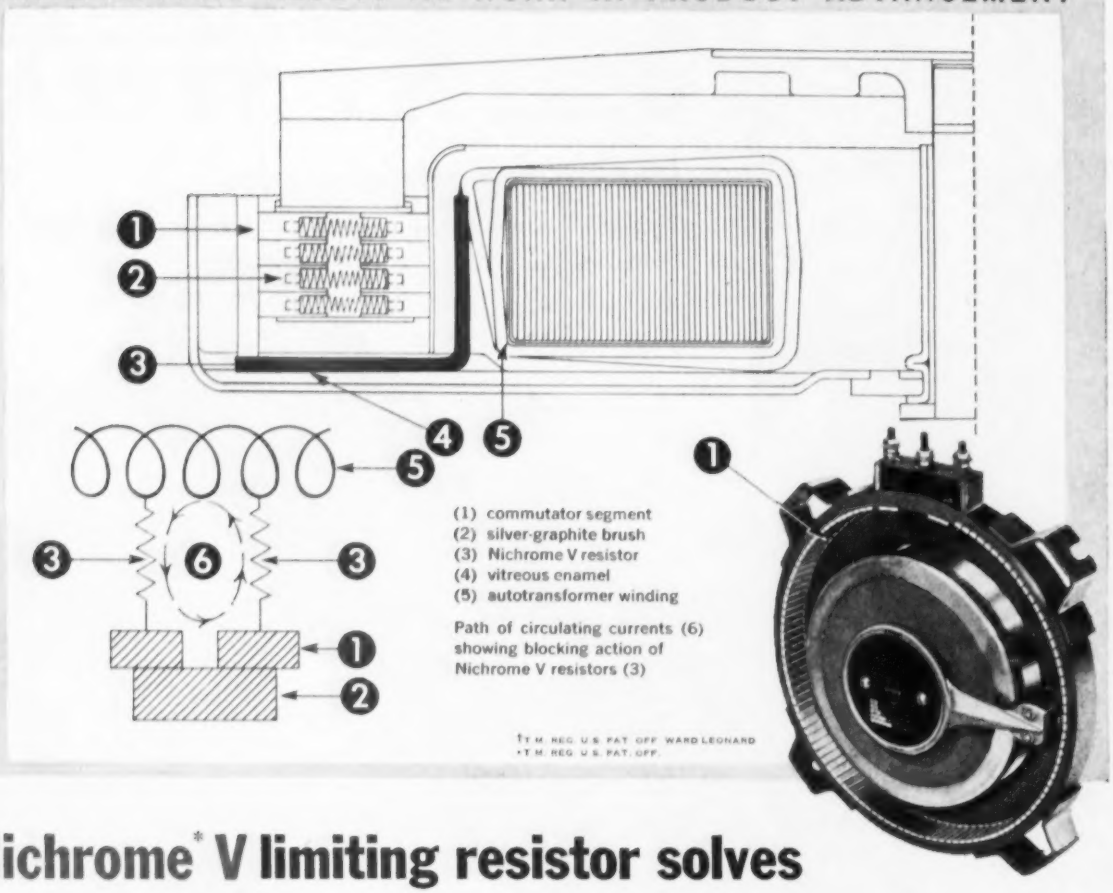
Plants at: ST. LOUIS • FAYETTEVILLE, ARK.
SHENANDOAH & CLARINDA, IA. • GUELPH, ONT., CAN.

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor

Maydwell and Hartzell, Inc.

Los Angeles • Seattle • Portland
San Francisco • Spokane • Phoenix

DRIVER-HARRIS ALLOYS AT WORK IN PRODUCT ADVANCEMENT


(1) commutator segment
(2) silver-graphite brush
(3) Nichrome V resistor
(4) vitreous enamel
(5) autotransformer winding
Path of circulating currents (6) showing blocking action of Nichrome V resistors (3)

†T.M. REG. U.S. PAT. OFF. WARD LEONARD
*T.M. REG. U.S. PAT. OFF.

Nichrome* V limiting resistor solves age old brush problem in Ward Leonard Dimmers

This Ward Leonard 6.6 KW Radiastat† Dimmer is essentially a specially designed core type autotransformer whose output voltage is linear, furnishing smooth, stepless control from maximum to zero. Other notable features are: Highest rating in smallest size and longer, maintenance-free life.

Nearly all adjustable autotransformers depend upon carbon brushes to limit the short-circuiting current which occurs whenever the brush straddles two segments. However, in the Radiastat Dimmer, circulating currents are kept to a minimum in a unique way, permitting use of self-cleaning, self-lubricating, low resistance silver-graphite brushes.

In the Radiastat, each segment is electrically connected to its respective turn of the winding through a Nichrome V current limiting resistor. During commutation, the main winding is protected against burnout from high short-circuiting currents thereby eliminating external resistors or high resistance brushes.

These all important resistors (one for each segment) connect to the segments beneath the vitreous enamel and run out and up to connect with the winding. They protect every step of the Radiastat, regardless of the contact arm position—drop a penny or a nail across adjacent segments—there's no pouff! no burnout! The Nichrome V circulating current resistors completely safeguard the unit.

Nichrome V is used because it supplies a specified ohmage in a #10 wire 3⅜" long; bonds well with the vitreous enamel; is highly resistant to heat and corrosion, and easily withstands severe current surges.

Driver-Harris now produces 132 different high nickel alloys in many different forms and in hundreds of sizes for almost every kind of industrial application. Do you need help with a special alloy? Tell us about it and if we haven't got it, we'll develop it for you.

*Driver-Harris** Company

HARRISON, NEW JERSEY • BRANCHES: Chicago, Detroit, Cleveland, Louisville
Distributor: ANGUS-CAMPBELL, INC., Los Angeles, San Francisco • In Canada: The B. GREENING WIRE COMPANY, Ltd., Hamilton, Ontario

MAKERS OF THE MOST COMPLETE LINE OF ALLOYS FOR THE ELECTRICAL, ELECTRONIC, AND HEAT-TREATING INDUSTRIES

Put National Electric
Xduct Junior EMT to the

ONE SURE FISH TEST... TRY IT YOURSELF

A special enamel inside coating gives National Electric Xduct Junior EMT its superior fishing qualities.

This specially developed inner wall finish not only protects the interior of the conduit against corrosion but provides a smooth slick surface that reduces friction between conduit walls and wires to a minimum. Actual fish tests on 6 leading types of conduit conducted by "on the job" electricians proved Xduct Junior more than twice as easy to start and far easier on the constant pull.

Try fishing Xduct Junior yourself.

In addition — NE Xduct Junior is easy bending. It's made of a high quality, very ductile metallic tubing. When properly bent, Xduct Junior will not flatten at the bend.

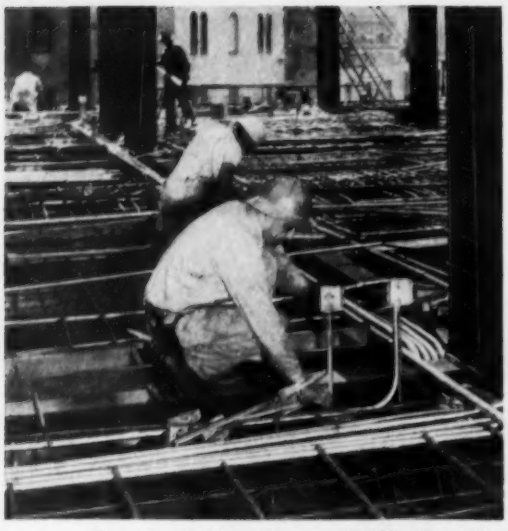
NE Xduct Junior has full zinc protection. Every length is silver-bright, with an electrogalvanized protective zinc coating that will not flake or crack.

Listed by Underwriters' Laboratories, Inc.

National Electric Products

PITTSBURGH, PA.

2 Plants • 12 Warehouses • 41 Sales Offices



Electricians finish work on the SPANG HD installation prior to pouring of concrete. SPANG HD is highly resistant to corrosion in damp locations.

Architect: Schmidt, Garden & Eriksen, Chicago, Ill.
Builder: Ragnar Benson Inc., Pittsburgh, Pa.
Electrical Contractors: Howard P. Foley Co., Pittsburgh, Pa.
Patterson-Emerson-Comstock, Inc., Pittsburgh, Pa.
SPANG Distributor: Graybar Electric Co., Pittsburgh, Pa.

88 miles of SPANG® Conduit protect wiring

SPANG HD is uniform in every respect, bends easily and accurately on the job, saves installation time.

SPANGLEAM EMT is used for short runs and lighting. Smooth interior finish makes wire pulling easy.

The Schools of the Health Professions Building houses classrooms, offices, labs, student center, library, auditorium, laundry and dining facilities. SPANG Conduit protects the wiring throughout the structure.

at University of Pittsburgh's new medical building

SPANG HD and SpanGleam EMT specified because of quality and service

The new Schools of the Health Professions Building at the University of Pittsburgh houses the Schools of Medicine, Pharmacy, Dentistry, and Nursing. SPANG HD Conduit and SPANGLEAM EMT protect the wiring throughout this modern 15-million dollar, 13-story structure. SPANG was used by the contractor, Ragnar Benson, Inc., because of the service required on a job of this size and the high quality of SPANG Conduit.

The Spang HD Installation . . . Electricians installed 342,920 ft of SPANG HD Galvanized Conduit for general electrical service in the building. The excellent corrosion-resisting characteristics of the SPANG HD finish permitted its use in damp areas. With the exception of the laboratories, all conduit is covered.

"SPANG gave us good delivery," said Mr. J. D. Brown, engineer for Patterson-Emerson-Comstock, Inc. "We got what we needed when we wanted it and the way we wanted it."

The SpanGleam Installation . . . For short runs and lighting, 126,000 ft of SPANGLEAM EMT were installed. "SPANGLEAM is a top-quality, first class product," said Mr. Brown. "There was no chipping or peeling of the finish, and the blue plastic tape bundling on SPANGLEAM is an important safety factor in handling the conduit."

You get Top Quality with Spang . . . because SPANG Conduit is *quality-controlled* throughout its manufacturing and is carefully inspected before shipping. You'll find SPANG will save you time on the job, make installations easier, more profitable. If you've never tried SPANG Conduit, make it a point to use it on your next job. Your local SPANG Distributor will be glad to serve you.

SPANG® CONDUIT

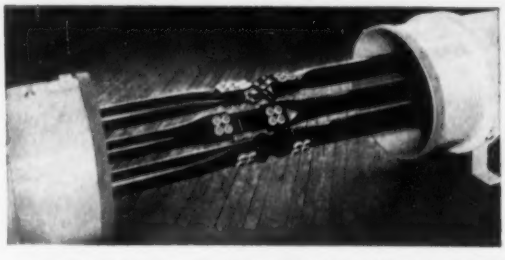
SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

NONSEGREGATED PHASE BUS

. . . completely sealed, air and porcelain insulated

I-T-E adds another first to its achievements in the design and development of bus structures—4.16, 7.2 and 13.8 kv., 1200-3000 ampere nonsegregated phase bus that is completely sealed and air and porcelain insulated. No organic materials are used for insulation. Cork neoprene-gasketed split-half round covers provide a completely sealed bus that can be used indoors or outdoors; bare copper or aluminum conductors are mounted on purified porcelain which has high dielectric strength, is inherently contamination free. The entirely new design has other outstanding advantages, too. The circular design permits installation in much less space. Flexible or laminated connectors make unit sections easier to install.

I-T-E nonsegregated phase bus is ideal for generator leads to transformers, for connecting transformers to switchgear assemblies, for interconnecting switchgear assemblies, and for distribution of light and power in factories and office buildings. For complete information on this new I-T-E product, contact your local I-T-E sales representative. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia 30, Pa.



COMPLETELY SEALED, AIR AND PORCELAIN INSULATED DESIGN eliminates organic insulating materials, permits use indoors and outdoors. Circular construction permits installation in much less space, provides optimum performance—mechanically, thermally and electrically. Laminated connectors provide unusual flexibility, simplify installation. Also compensate for expansion and contraction in service.

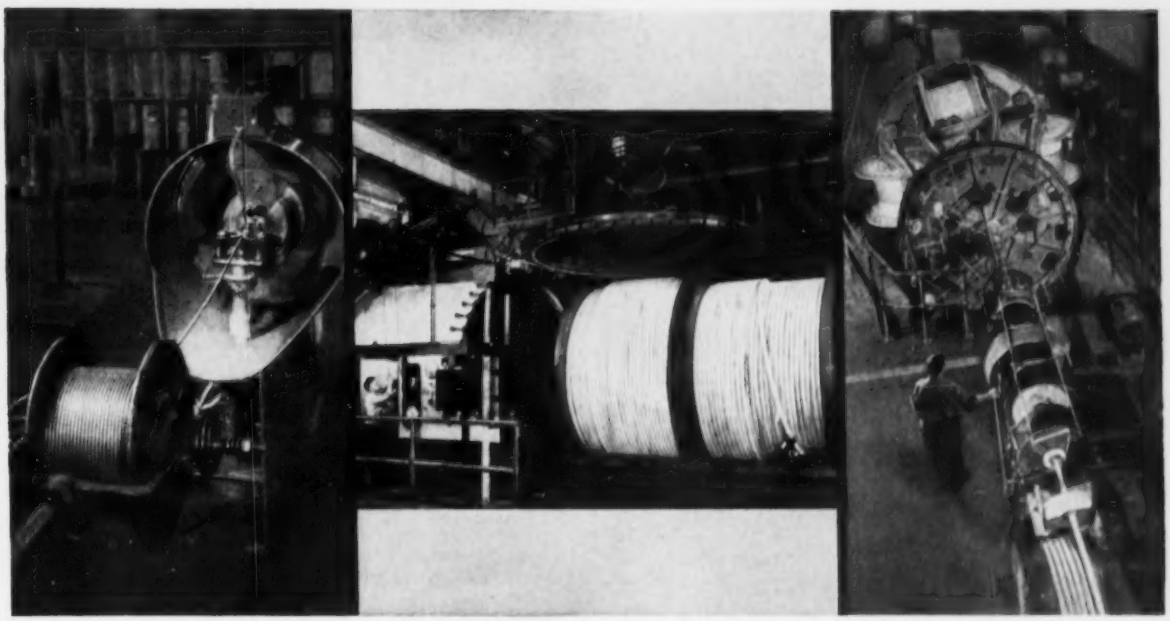
I-T-E CIRCUIT BREAKER COMPANY • **Switchgear Division**

IN CANADA: EASTERN POWER DEVICES LTD.

GENERAL CABLE

PAPER INSULATED
VERSATILE · RELIABLE
POWER CABLES

Manufactured at BAYONNE, N. J. • ST. LOUIS, MO. • EMERYVILLE, CALIF.



This machine forms steel strip into helical coil ducts or channels for use in gas filled or oil filled cable.

Impregnating Tank utilized in the heat-vacuum drying and oil impregnation steps in the manufacture of Paper Power Cable.

Large Cabling Machine used in cabling individually insulated conductors into multiple conductor assemblies.

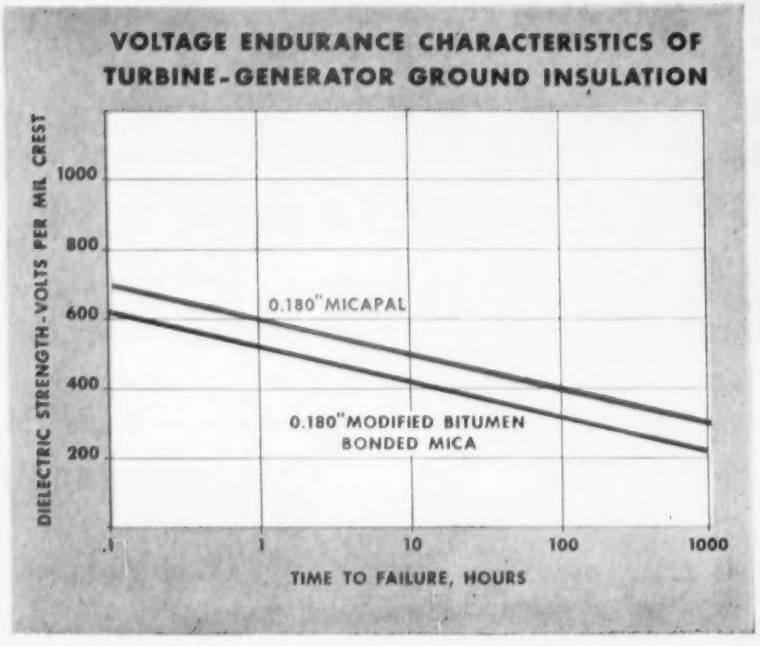
- **SOLID TYPE**
- **LOW PRESSURE GAS FILLED**
- **LOW PRESSURE OIL FILLED**
- **PIPE TYPE**
  - **High Pressure Gas Filled**
  - **High Pressure Oil Filled**

The excellent operating record over many years and the superior electrical characteristics of paper insulated cable highly recommends its use for all power applications. Paper Power Cable is a predominant type in preference and use for voltages above 5 KV.

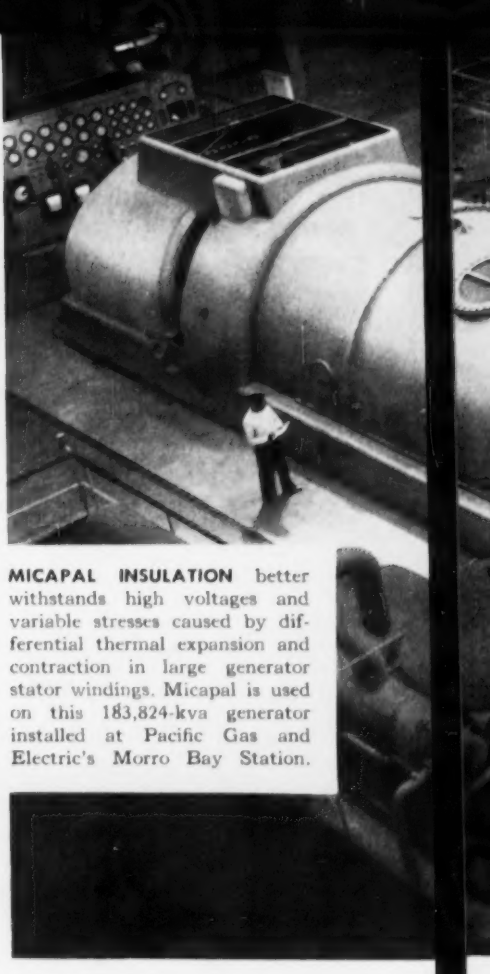
General Cable Corporation is equipped with the finest modern facilities for paper taping and with many years of know-how is in a position to supply a high quality product for all low and high voltage applications.

GENERAL CABLE CORPORATION
420 Lexington Avenue, New York 17, N. Y.
Offices and Distributing Centers Coast-to-Coast

for quality and economy... **specify GENERAL CABLE**

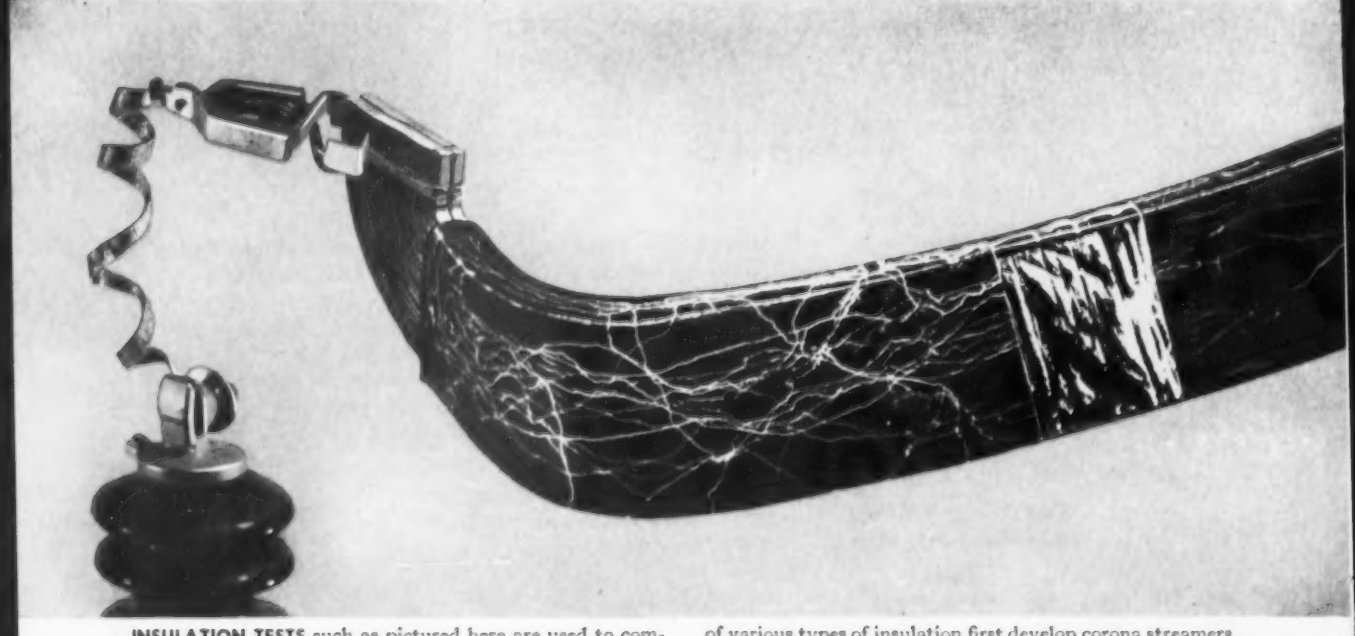


SIGNIFICANT IMPROVEMENT is noted in voltage endurance obtained for any duration of voltage application on Micapal compared to presently accepted generator insulating material. This improved voltage endurance increases long-term turbine-generator availability.

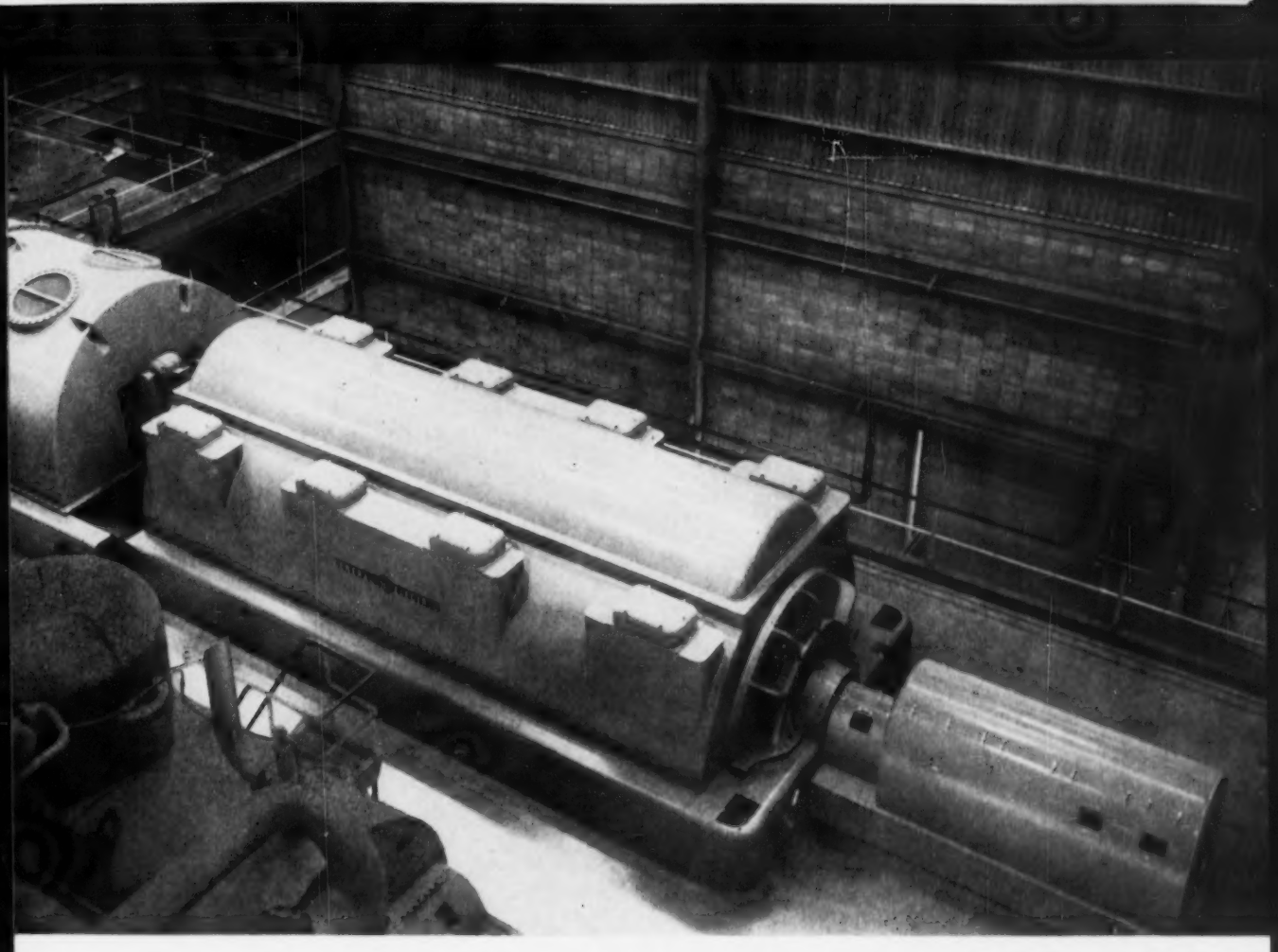


MICAPAL INSULATION better withstands high voltages and variable stresses caused by differential thermal expansion and contraction in large generator stator windings. Micapal is used on this 183,824-kva generator installed at Pacific Gas and Electric's Morro Bay Station.

How General Electric Micapal



INSULATION TESTS such as pictured here are used to compare the dielectric breakdown of different insulations. Forced to carry voltages far above their rating, test bars of various types of insulation first develop corona streamers, then finally fail, enabling engineers to measure the insulation's actual voltage endurance.



insulation extends generator life

IMPROVED INSULATION BETTER WITHSTANDS HIGH VOLTAGES, VARIABLE STRESSES

Now, after extensive research and four years of operating experience, General Electric announces the extended application of Micapal insulation for high-voltage stator windings. A major advance in providing still longer, more reliable operation, this mica-based insulation offers these distinct advantages:

Greater Tensile Strength. Micapal incorporates mica mat and some mica flake bonded with a duplex thermosetting resin. Mica mat is finely divided, reconstituted mica formed into sheets. The thermosetting binder, combined with uniform mica structure, makes Micapal much tougher at operating temperatures than earlier insulations.

Greater Dimensional Stability. Micapal is molded to the precise shape of generator armature bars. Because of thermosetting qualities, the insulation won't flow or lose shape. It possesses great mechanical strength over the full range of operating temperatures.

Improved Thermal Conductivity. Micapal removes heat from electrical conductors more easily. The result is that for a given current and same insulation thickness, the armature bar runs cooler.

Improved Dielectric Breakdown Strength. The voltage endurance characteristics shown on the chart, above, illustrate how Micapal insulation withstands a much higher voltage than other mica insulation for any given period of time. The impulse puncture structure of Micapal has been shown by laboratory tests to be higher by an even greater factor.

Improved Micapal insulation is just another example of General Electric steam turbine-generator progress in meeting tomorrow's power demands. For more information on new generator developments, write Large Steam Turbine-Generator Department, General Electric Company, Schenectady 5, New York.

254-41

Progress Is Our Most Important Product

GENERAL ELECTRIC

Along today's modern highways easy-to-handle J-M Transite Ducts provide installation economies and years of service life, protecting traffic-signal, lighting, and other power-service circuits.

J-M Transite® Ducts install fast to last... give complete cable protection.

Because speed and economy set the pace in today's highway programs, more and more highway cables are going into Johns-Manville Transite Ducts.

For speed, Johns-Manville Transite Ducts are strong, light and long—easy to handle and install. Workmen set 10-foot lengths in place easily, join them up tight in seconds with snug-fitting J-M Plastic Couplings, and Transite's smooth bore is free of burrs and other obstructions that may interfere or cause damage during pulling of cables.

For economy, J-M asbestos-cement Transite Ducts go in to stay. Non-conductive Transite is not affected by electrolysis—resists the corrosive action of fills or high-salt soils in permanently damp locations. Millions of feet of installed Transite Ducts have proved that Transite withstands earth loads and soil stress . . . resists vibration and shock from highway traffic.

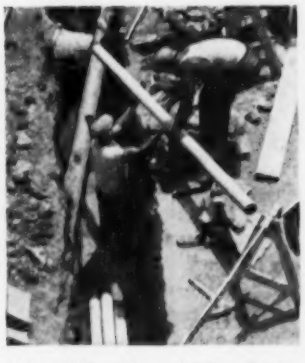
Let us send you free Transite Duct brochure EL-29A. Write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

JOHNS MANVILLE JM PRODUCTS

JOHNS-MANVILLE Transite Ducts

Made of Asbestos-Cement

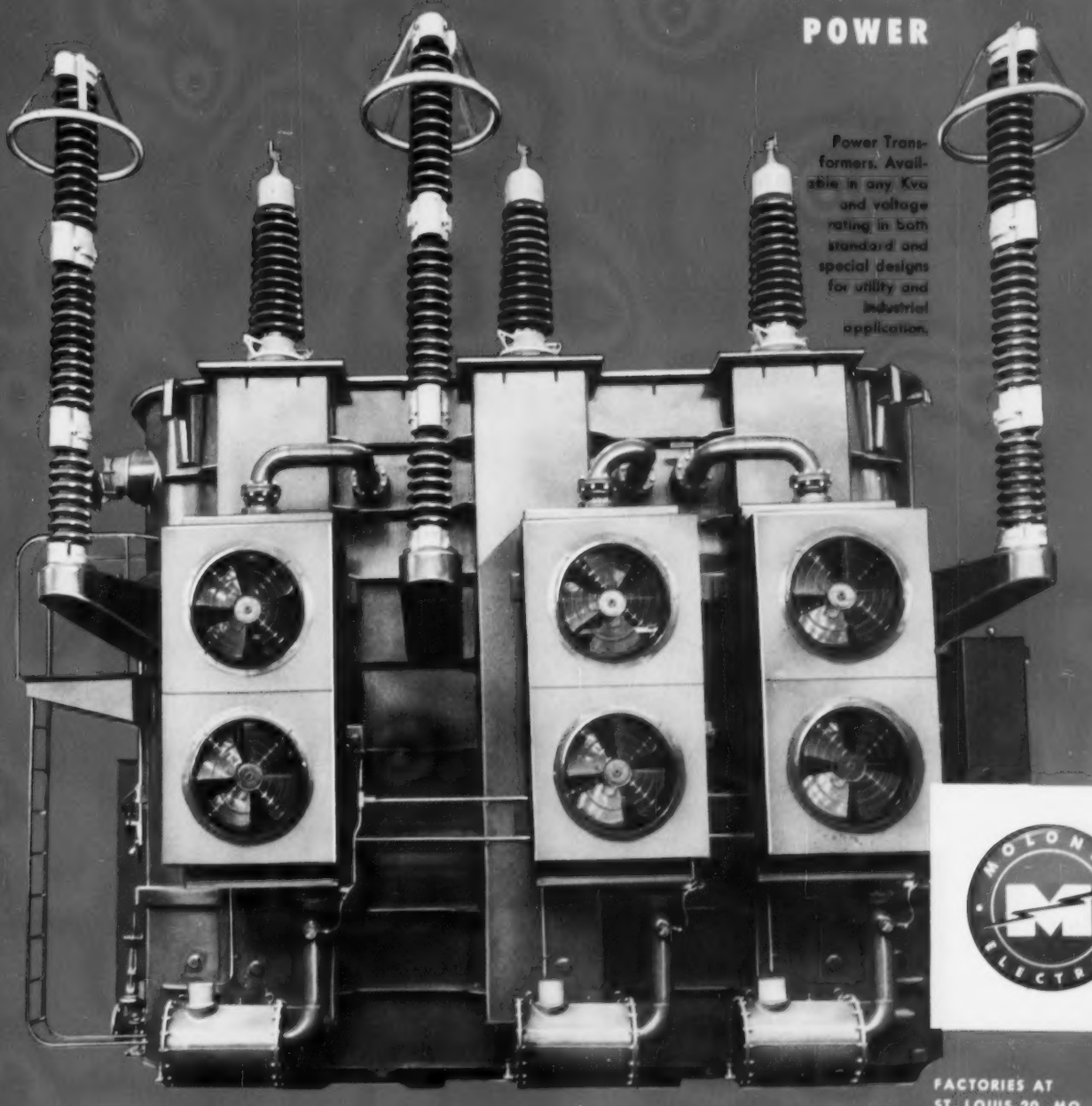
J-M Conduit for direct buried banks and exposed runs
J-M Korduct® for concrete banks



Johns-Manville Asbestos Transite Ducts can be laid directly in trench without concrete envelope or other mechanical protection.

BULLETIN NO. G-57

TWENTY-SEVEN DEPENDABLE PRODUCTS FOR DISTRIBUTING POWER



Power Transformers. Available in any Kva and voltage rating in both standard and special designs for utility and industrial application.

MOLONEY ELECTRIC

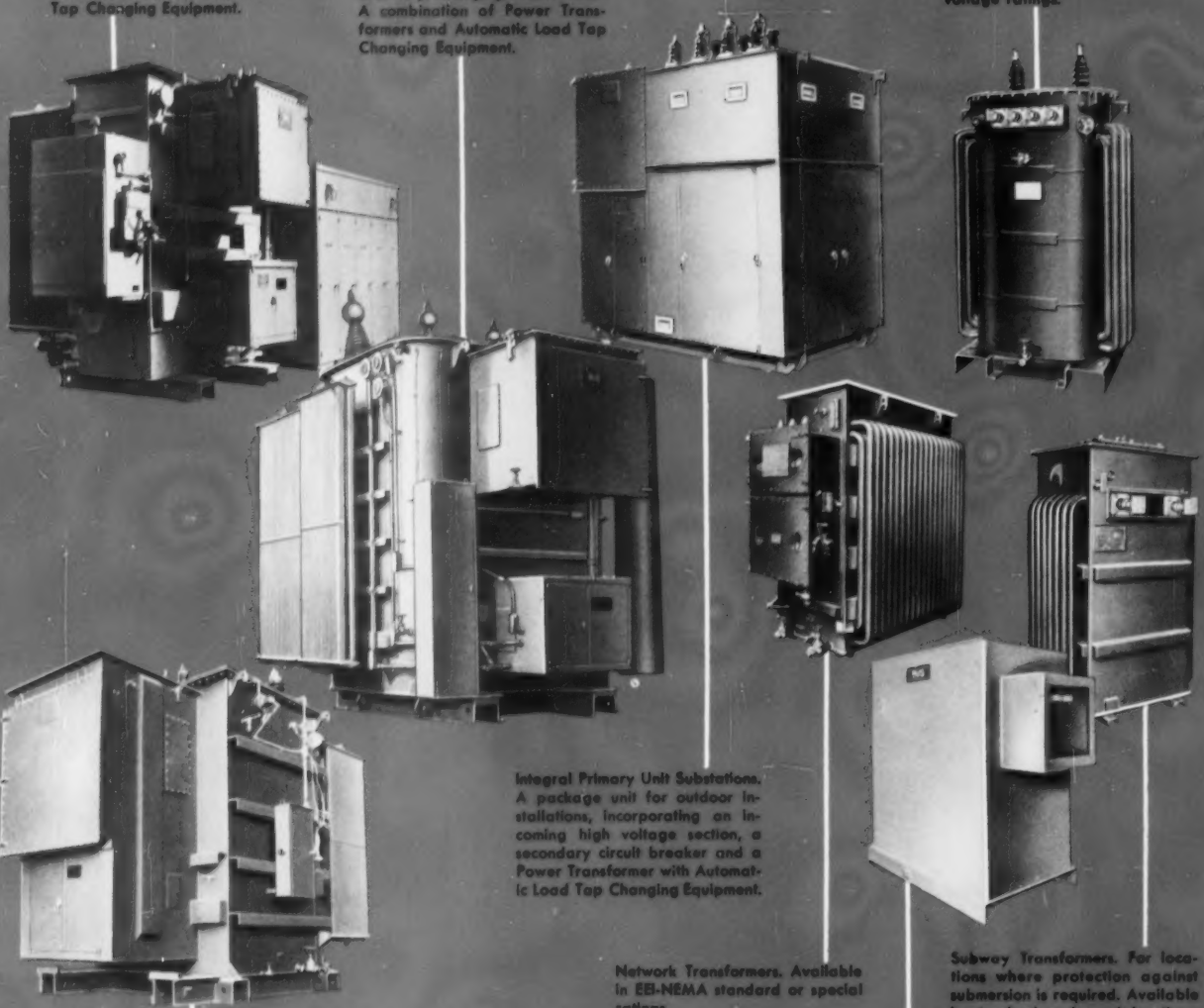
FACTORIES AT
ST. LOUIS 20, MO.
AND TORONTO, ONT.,
CANADA

PRESENTING MOLONEY'S COMPLETE LINE OF POWER.....

Articulated Primary Unit Substation. For outdoor installations in all Kva and voltage ratings. Consists of an incoming high voltage section, an outgoing low voltage section and a transformer section with or without Automatic Load Tap Changing Equipment.

Load Tap Changing Transformers. A combination of Power Transformers and Automatic Load Tap Changing Equipment.

Large Distribution Transformers. For substation application. Available in all standard Kva and voltage ratings.



Integral Primary Unit Substations. A package unit for outdoor installations, incorporating an incoming high voltage section, a secondary circuit breaker and a Power Transformer with Automatic Load Tap Changing Equipment.

Network Transformers. Available in EEI-NEMA standard or special ratings.

Subway Transformers. For locations where protection against submersion is required. Available in standard and special ratings.

Regulating Transformers and Feeder Voltage Regulators. Available in all standard and special Kva and voltage ratings to provide constant line voltage for all transmission and feeder lines.

Nitrogen-Sealed Dry-Type Load Center Transformers (Group 3 Insulated) for Secondary Unit Substations. Available in Kva and voltage ratings to meet your specifications for indoor and outdoor installation.

MOLONEY

SALES OFFICES IN ALL PRINCIPAL CITIES

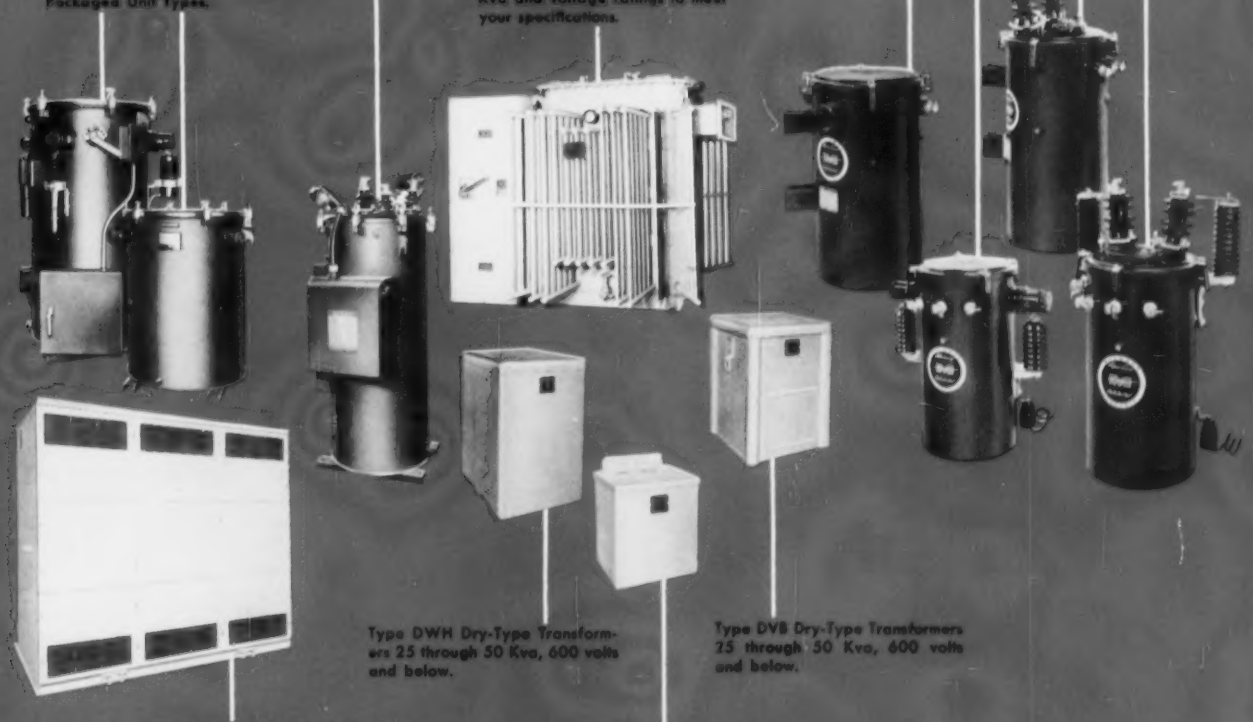
. . . . AND DISTRIBUTION TRANSFORMERS . . . AND . . . . .

Single-Phase Pole-Type Feeder Voltage Regulators. Self-contained and completely automatic to provide plus or minus 10% voltage regulation in 32— ⅝% steps.

Constant Current Transformers. Available in standard and special ratings in both Conventional and Packaged Unit Types.

Oil and Askarel-Immersed Load Center Transformers for Secondary Unit Substations. Available in Kva and voltage ratings to meet your specifications.

HyperCore Conventional and CSP Distribution Transformers. Available in all standard ratings.



Type DWH Dry-Type Transformers 25 through 50 Kva, 600 volts and below.

Type DVB Dry-Type Transformers 25 through 50 Kva, 600 volts and below.

Ventilated Dry-Type Load Center Transformers (Group 2 Insulation). For Secondary Unit Substations. Available in Kva and voltage ratings to your specifications for indoor installations.

Type DWH Dry-Type Transformers 1½ through 15 Kva, 600 volts and below.

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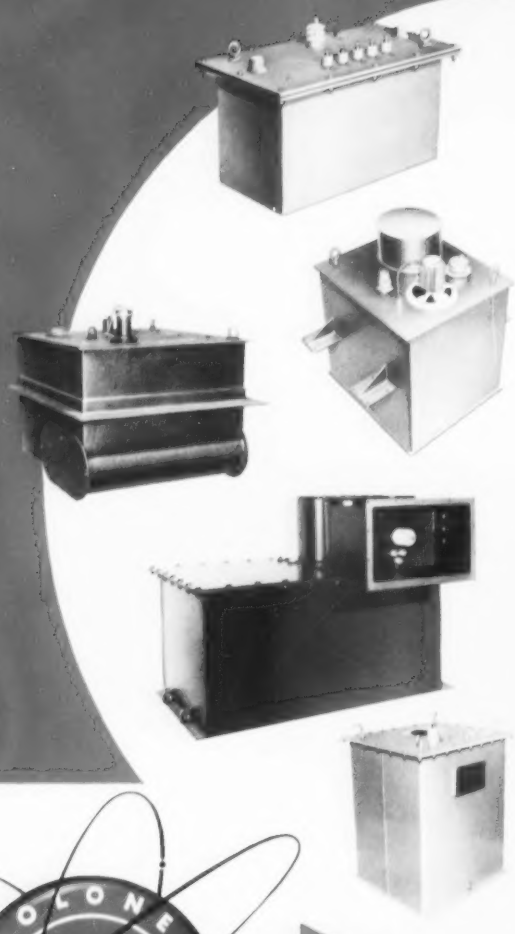
FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

MOLONEY'S MAGNETIC COMPONENTS FOR ELECTRONICS



Magnetic Components for transmitters, radar equipment, induction heating, precipitation and other special applications. Complete power supplies, rectifier transformers, filter reactors, filament transformers, modulation transformers and reactors.

Moloney Electric Company is the proven industry leader in the manufacture of Magnetic Components for Electronics . . . from the world's largest pulse transformer to smaller units for airborne applications.

LITHO IN U. S. A.

MOLONEY ELECTRIC COMPANY

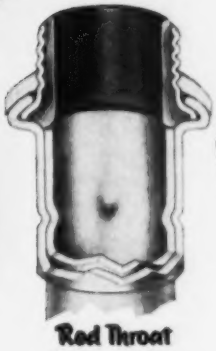
Manufacturers of
Transformers for Utilities, Industry and Electronic Applications

SALES OFFICES IN ALL PRINCIPAL CITIES
FACTORIES AT ST. LOUIS 20, MISSOURI AND TORONTO, ONT., CANADA

B-M

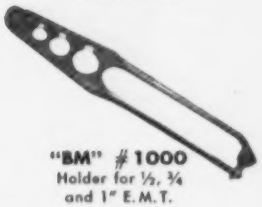
the original concrete-tight **INDENTER FITTINGS** *for E.M.T.*

Red Throat
Insulated Connector

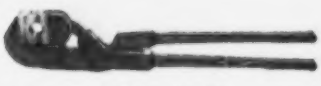


Red Throat
Cross section

"BM" #100
Cutter for ½, ¾ and 1" E.M.T.



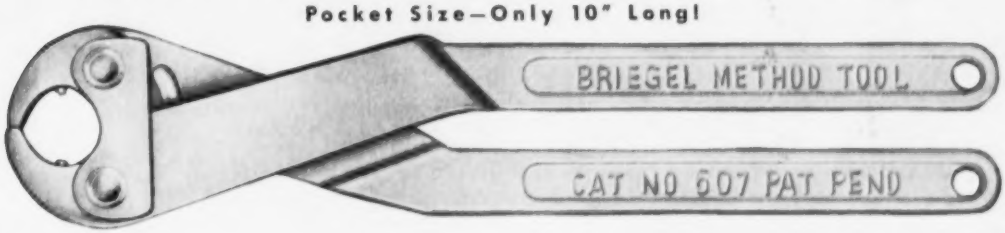
"BM" #1000
Holder for ½, ¾ and 1" E.M.T.



"BM" #600
Changeable Jaw Indenter

THE NEW BM607 INDENTER FOR ½" FITTINGS

Pocket Size—Only 10" Long!



FREE 30 DAY TRIAL OF THE NEW BM-607 ½" INDENTER

Your BRIEGEL Distributor has been authorized to give you a 30 DAY FREE TRIAL of the New BM-607 Indenter for ½" fittings.

This Smaller Lightweight Tool requires only half the hand pressure formerly needed to make neat deep positive grounded impressions.

Ease of action is made possible by an exclusive new Floating-Fulcrum principle that greatly increases leverage.

Try the New BM-607 Indenter Free for 30 Days. See for yourself how much lighter it is to carry—how much easier it is to use!

THIS FREE TRIAL OFFER IS LIMITED TO 30 DAYS

All B-M Indenter Fittings are U.L. Approved as concrete-tight and all Compression Fittings as rain-tight as well as for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

SOLD ONLY THROUGH ELECTRICAL WHOLESALERS

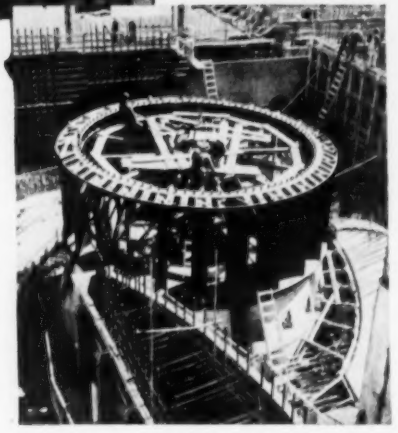
Eight B-L-H turbines to produce 640,000 hp at St. Lawrence Power Project

Shop assembly of stay ring and discharge ring for one of the eight turbines now being built by the Eddystone Division of B-L-H for the St. Lawrence Power Project.

Deliveries are now underway on an order for eight B-L-H fixed blade propeller turbines for the St. Lawrence Power Project. Each of these huge turbines is rated to produce 80,000 hp at 94.73 rpm under 81-ft. head. The first unit was recently delivered to the site of the powerhouse on Barnhart Island, N.Y. The last of the eight B-L-H units for this vast Canadian-American undertaking is scheduled to be completed and ready for shipment in December 1958.

The St. Lawrence Seaway and Power Project is the largest engineering feat ever performed on the North American continent.

Throughout the world, hundreds of hydroelectric plants are operating at maximum efficiency, thanks to B-L-H's 130 years' experience in designing and building hydraulic turbine equipment. Since we build all four basic types of turbine—impulse, Kaplan, Francis and propeller—you can be certain that our recommendations are objective. For additional information, write to B-L-H Corporation, Philadelphia 42, Pa., or Pelton Division (B-L-H), 2929 Nineteenth Street, San Francisco 10, Calif.



The stay ring on Baldwin-built Unit No. 30 is being accurately aligned at the St. Lawrence Power Dam, Barnhart Island, N.Y. Photograph courtesy Power Authority of the State of New York.

BALDWIN · LIMA · HAMILTON

Eddystone Division

Philadelphia 42, Pa.

Hydraulic turbines • Weldments • Dump cars • Nonferrous castings

GEDNEY'S RIGHT THERE IN YOUR CORNER

helping save time . . . hold down costs

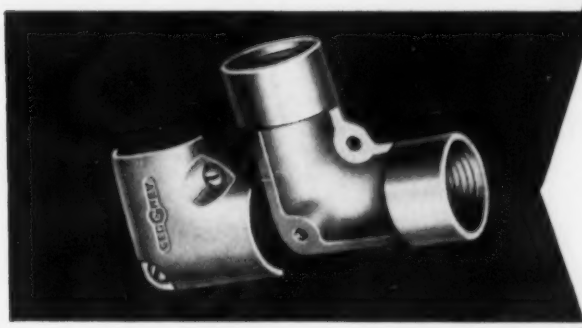
CORNER FITTINGS? Well, here are three that have proved immensely popular for the simple reason they're easiest to install—save time and labor that really counts up. Like the rest of the full Gedney line they're made of unbreakable malleable iron...accurately machined and threaded... individually inspected. Order Gedney—always—for lowest installed costs!

90° CORNER ELLS

Fitted with gasketed cover. Both ends female. Made of malleable iron, cadmium plated. Available in a full range of sizes from ½" to 2".

90° CORNER ADAPTERS

Fitted with gasketed cover. One end male, one end female. Made of malleable iron, cadmium plated. Your choice of sizes from ½" to 2".



CORNER PULL-IN CONDUIT ELLS

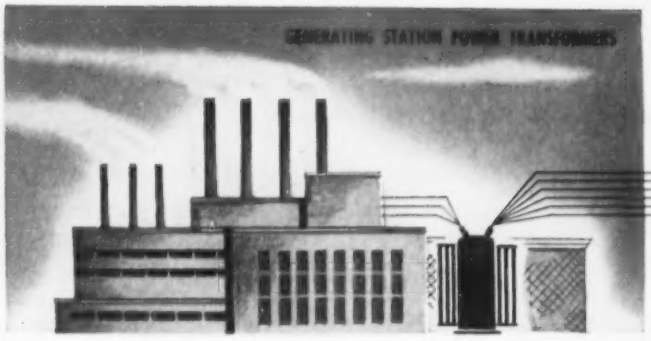
Today's top specification for space-saving, machine wiring, easy wire pulling. Malleable iron, cadmium plated. Sizes run from ½" to 2".

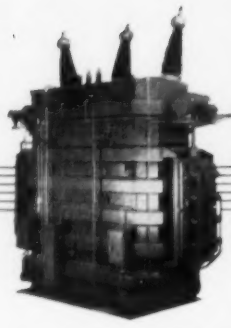
GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

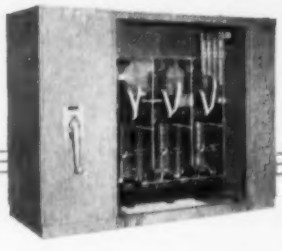




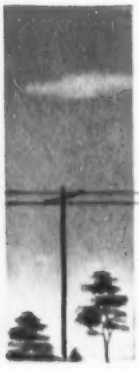
WAGNER TRANSFORMERS

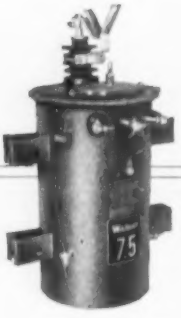
SMALL DRY-TYPE TRANSFORMERS
Single-phase and three-phase, 1 to 300 kva, 600 volts and below.

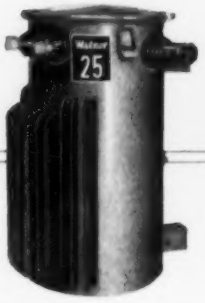
VENTILATED DRY-TYPE LOAD CENTER TRANSFORMERS
Wagner also builds Nitrogen sealed dry-type transformers.

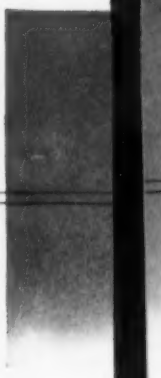


Central Station - - Industrial - -









ENGINEERED FOR LONG

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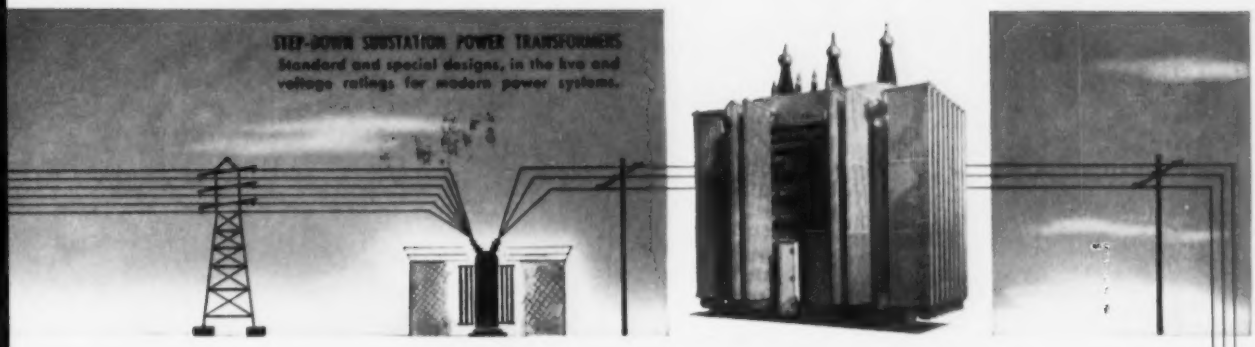
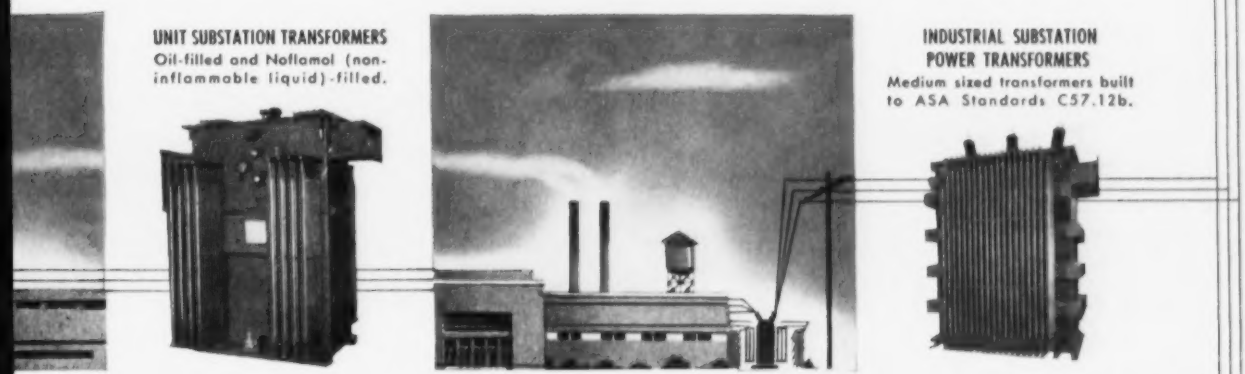
SERVING INDUSTRY SINCE 1891

BRANCHES AND DISTRIBUTORS
IN ALL PRINCIPAL CITIES

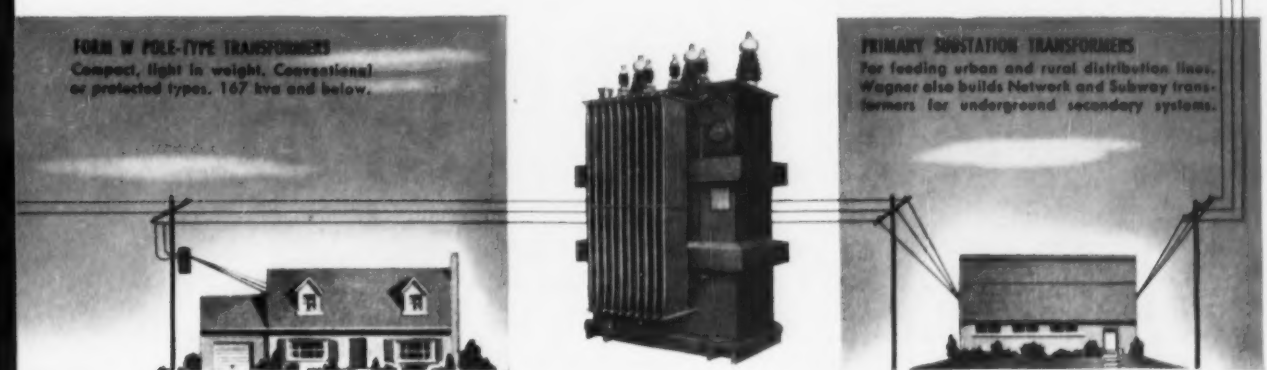
ELECTRIC MOTORS • TRANSFORMERS •


STEP-DOWN SUBSTATION POWER TRANSFORMERS
Standard and special designs, in the kva and voltage ratings for modern power systems.

FOR EVERY NEED . . .


UNIT SUBSTATION TRANSFORMERS
Oil-filled and Noflamol (non-inflammable liquid)-filled.
INDUSTRIAL SUBSTATION POWER TRANSFORMERS
Medium sized transformers built to ASA Standards C57.12b.

Transmission - - Distribution

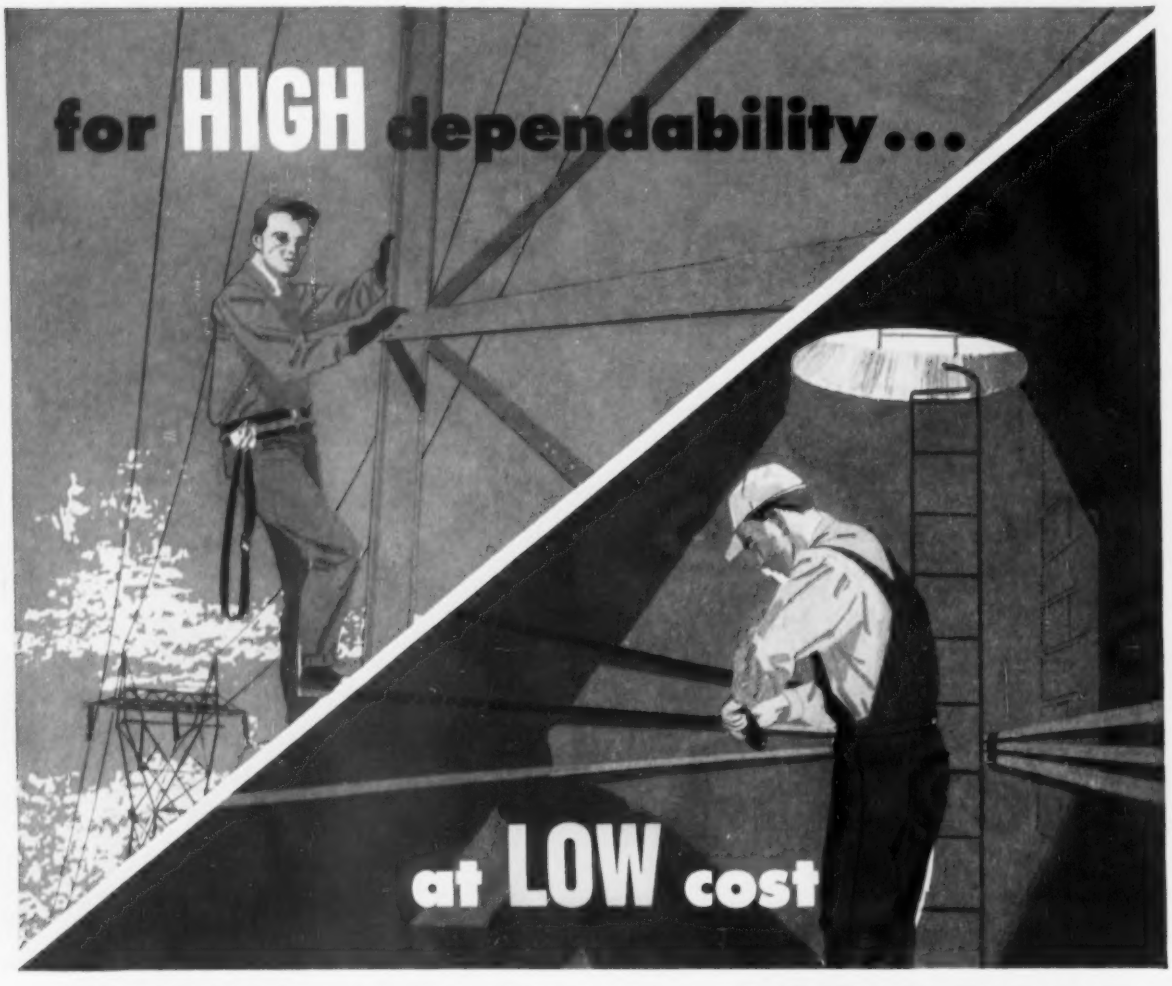

FORM W POLE-TYPE TRANSFORMERS
Compact, light in weight. Conventional or protected types. 167 kva and below.
PRIMARY SUBSTATION TRANSFORMERS
For feeding urban and rural distribution lines. Wagner also builds Network and Subway transformers for underground secondary systems.

DEPENDABLE SERVICE

Wagner Electric Corporation
6381 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.

LIVE BETTER ELECTRICALLY

INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR & HYDRAULIC



DUTCH BRAND PLASTIC TAPE

for every electrical need!

From high line to cable vault Dutch Brand Plastic Electrical Tape meets the requirements of the job. It has high dielectric strength, over 1000 volts per mil of thickness, with stretch to conform neatly and smoothly to irregular shapes. It protects against corrosion, is weatherproof, waterproof, rot, mildew and fungus proof. Linemen and electricians know the value of dependable tape . . . and tape economy.

That's why they insist on safe, easy-to-use Dutch Brand Plastic Tape for every electrical maintenance, production and construction job. Available in the sizes and widths to meet every requirement.

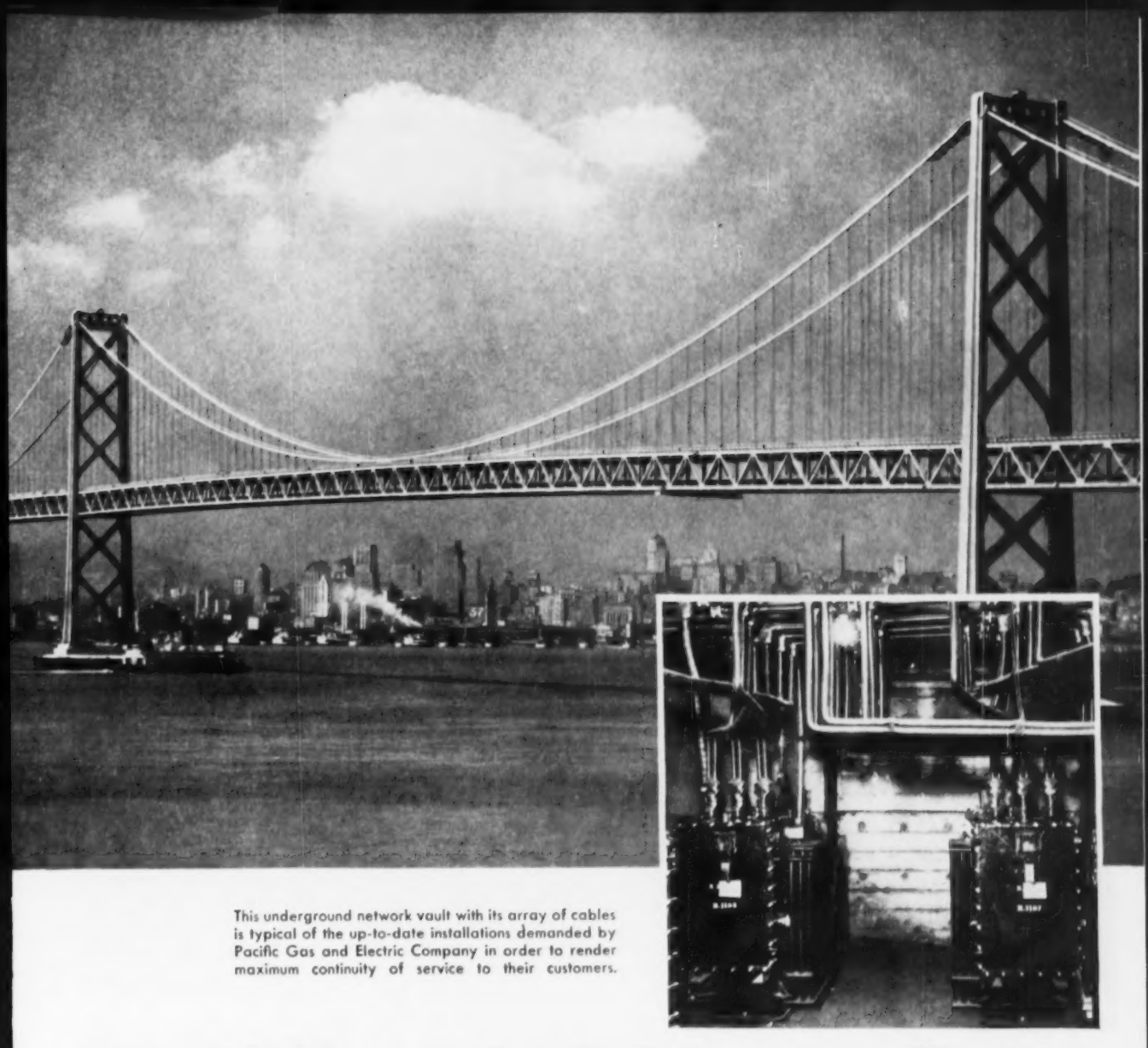
Write for booklet—*In the market for new ideas on tape as a time-and-money-saver? Send for "Big Four in Electrical Tapes," our new booklet. Write today!*

Johns-Manville Dutch Brand Products
7800 South Woodlawn Avenue
Chicago 19, Illinois

JOHNS-MANVILLE JM PRODUCTS

DUTCH BRAND

JOHNS-MANVILLE



This underground network vault with its array of cables is typical of the up-to-date installations demanded by Pacific Gas and Electric Company in order to render maximum continuity of service to their customers.

Dependable service below pays off above

Pacific Gas and Electric Company's recent installation of nearly seven miles of Keystone butyl-insulated duct cable is just one part of its continuing network expansion to insure dependable power for San Francisco's ever increasing loads.

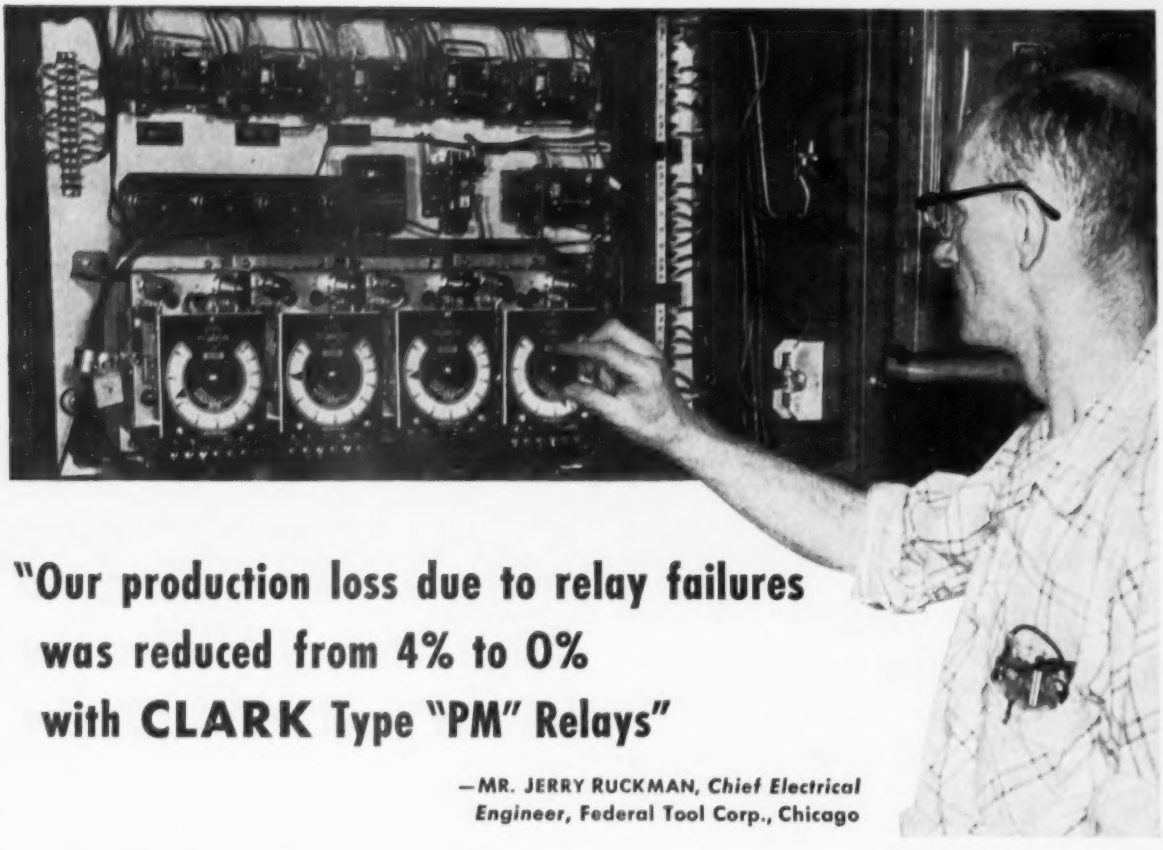
Meeting the rigid RO & N specifications set up by Pacific Gas and Electric Company engineers, Keystone butyl-insulated cables offer extra value in their high dielectric strength, moisture resistance, resistance to ozone and corona cutting, and in their ability to take sharp bends and withstand high conductor temperatures. Insulation and sheath are vulcanized together in a construction that withstands the moisture and heat in duct systems and allows simple, damage-free pulling.

Backed by Okonite research and quality control, Keystone butyl-insulated cables offer these service-lengthening features without any increase in cost.

Keystone is one of the family of Okonite insulations: Okolite and Okonex (strip-insulated types), Keystone and Watertite (extruded types). Bulletins are available on each from The Okonite Company, Passaic, N. J.

4188

where there's electrical power . . . there's **OKONITE CABLE**



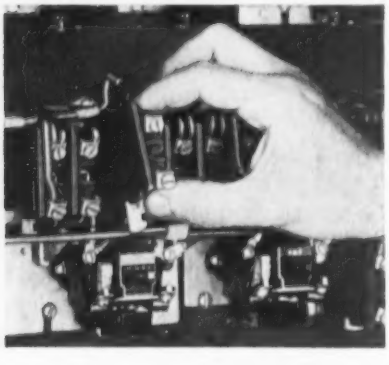
"Our production loss due to relay failures was reduced from 4% to 0% with CLARK Type "PM" Relays"

—MR. JERRY RUCKMAN, *Chief Electrical Engineer*, Federal Tool Corp., Chicago

Explains Chief Engineer Ruckman: "We turn out plastic housewares, haircurlers, toys, premiums and other plastic products by the hundreds of thousands every twenty-four hours. Demand is high. Customers insist on prompt delivery. That's why we were so concerned over the erratic operation of the relays in our molding machine control panels—the heart of our production line.

"We found that non-conductive plastic dust was collecting on the relay contacts, causing them to fail. When this happened, production was halted. Losses amounted to four percent.

"Two years ago we installed Clark Type PM relays, in which each set of contacts is shielded by its own melamine housing. Production stoppages from plastic dust have been cut to zero."



The unique sectional pole construction of the Clark Type "PM" relay offers many other important advantages

Compact, it's a space-saver. Rugged, it has built-in protection against vibration damage. Simple, it is easy to install and service. Each pole is a self-contained unit that can be removed, installed or replaced without disturbing the others. All terminals are in front for easy accessibility. Each pole has its own individual arcing chamber—a short circuit through one set of contacts is confined to a single pole, and will not destroy the entire relay.

The CLARK CONTROLLER Company

Everything Under Control 1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

RT&E Transformers

Weather Protected to Serve Longer

Like the postman, neither rain nor snow, nor hail, nor salt spray can prevent R T & E Transformers from doing their duty. Here's proof that every R T & E unit is completely "WEATHER PROTECTED."

- **FINISH:** Three coats of modified Alkyd paint for all season protection.
- **DESIGN:** Domed cover for immediate water run-off.
- **TANK:** Arc-welded seams and absence of lip on tank bottom mean no moisture collecting cracks and crevices.
- **BUSHINGS:** HV bushings internally clamped — no external clamps and bolts to corrode.

Plus stainless steel cover band to eliminate corrosion on accidentally scratched areas . . . stainless steel threaded mounting pads . . . all unpainted fittings either galvanized or electro-tinned.

R T & E "Weather-Protected" Transformers last longer, require less maintenance, serve better all year 'round.

Equipment to help provide power for America.

RT&E
CORPORATION
WAUKESHA, WISCONSIN

An 8-tier run of Soapstone OCT-O-DUCT provides a new telephone link down hard-rock Nob Hill to colorful Chinatown in San Francisco.

YOU CAN ACTUALLY SEE SOAPSTONE DUCT SAVE YOU MONEY

1 Trenchside delivery of Soapstone OCT-O-DUCT eliminates field inventory problems and makes certain your duct is at your job when you need it.

3 OCT-O-DUCT's exclusive, flat-sided design eliminates the need for expensive interlayer spacers. Duct will not roll.

2 OCT-O-DUCT's convenient 4-foot lengths can be quickly installed by 2-men crews even in narrow and deep trenches.

4 OCT-O-DUCT is connected in the trench with easy-to-apply circular couplings making possible fast, rhythmic, production-line installation.

The many time- and work-saving features of Soapstone OCT-O-DUCT and full information on the sizes, bends and accessories available from this 30-year-old Company are contained in our Catalog and Installation Manual. For your FREE copies, drop us a note on your letterhead.

SOAPSTONE DUCT COMPANY
3985 Beach Street, Oakland 8, California

Distributed in the West by
MAYDWELL & HARTZELL, INC.
SAN FRANCISCO, LOS ANGELES, SAN DIEGO,
PHOENIX, PORTLAND, SEATTLE, SPOKANE

PREFORMED ARMOR-GRIP SUSPENSION UNITS provide a

Pretty Soft Life for a Conductor

... cradled in durable neoprene

No vibration fatigue here. The Preformed Armor-Grip Suspension Unit (AGSU) eliminates failure by eliminating stress concentration.

The conductor is cushioned in a split neoprene core, held securely by Preformed rods that never lose their tight grip, and supported in an aluminum housing. Conductor is protected and longitudinal stresses are distributed through the entire length of the rods—not at one point.

Like other Preformed line accessories, the AGSU obsoletes bolted hardware. It's easier to apply (no tools needed), costs less, does a better job. You get mechanical strength and electrical protection, and—because of the smooth contour and large diameter of the rod ends—corona emission and radio influence are minimized.

Want to know more about the Preformed Armor-Grip Suspension Unit —or see the application demonstrated? Write PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland . . . in 10 years the leading manufacturer of armor rods, dead ends, Guy-Grip dead-ends and other line accessories.

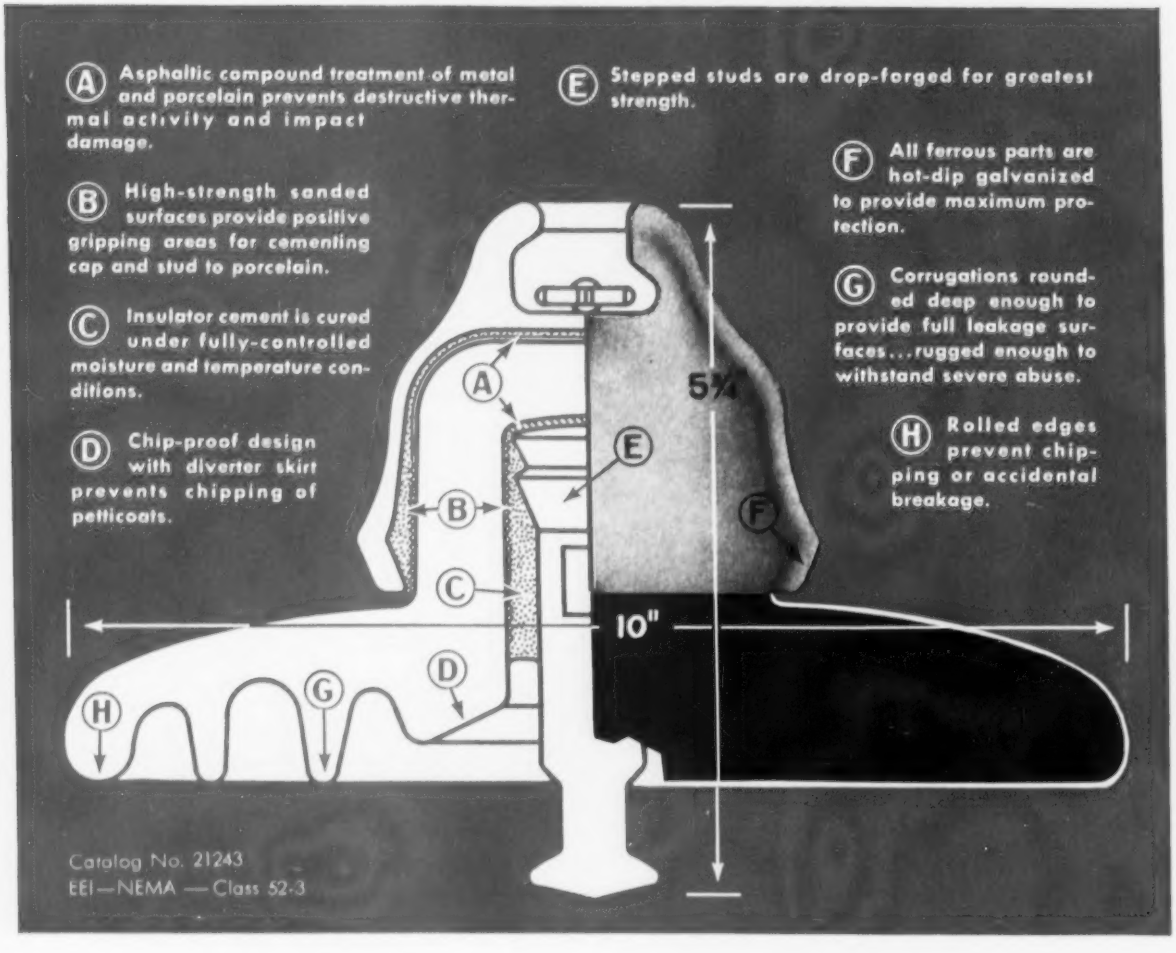
PLP

You can look up to Preformed

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

Custom-Built Thomas Insulators meet severest requirements

CHECK THESE FEATURES


(A) Asphaltic compound treatment of metal and porcelain prevents destructive thermal activity and impact damage.
(B) High-strength sanded surfaces provide positive gripping areas for cementing cap and stud to porcelain.
(C) Insulator cement is cured under fully-controlled moisture and temperature conditions.
(D) Chip-proof design with diverter skirt prevents chipping of petticoats.
(E) Stepped studs are drop-forged for greatest strength.
(F) All ferrous parts are hot-dip galvanized to provide maximum protection.
(G) Corrugations rounded deep enough to provide full leakage surfaces...rugged enough to withstand severe abuse.
(H) Rolled edges prevent chipping or accidental breakage.
5¾"
10"
Catalog No. 21243
EEI—NEMA — Class 52-3

Wherever service conditions make the severest demands on insulators, a Thomas Insulator always gives complete assurance of satisfactory performance. That is particularly true of the insulator illustrated. It is designed and custom-built for installations where physical ruggedness is as important as insulating effectiveness. It fully meets all standard requirements for insulators of its type and capacity. It embodies all the tested refinements of construction and design which assure longer service life and superior performance. Write today for free data sheet. Address Thomas Works, Delta-Star Electric Division, H. K. Porter Company, Inc., Lisbon, Ohio.

H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION

Divisions of H. K. Porter Company, Inc.: Cleveland, Connors Steel, Delta-Star Electric, Henry Disston, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan Crucible Steel, W-S Fittings, H. K. Porter Company (Canada) Ltd.

KUHLMAN "Salesman of the Week"

If you can identify this Kuhlman Electric Co. representative, and are the first one to notify Dept. SA-1, Kuhlman Electric Co., Bay City, Mich., you will receive a valuable gift certificate. Watch for the next Kuhlman "Salesman of the Week."

"QUICK GRIP" for 5 KV and below with the new big grip knob for quicker, tighter line connections.

NEW "QUICK GRIP" for voltages above 5 KV with all live parts protected from birds and animals.

"Here's my favorite success story . . .

"The story begins in 1939 when Kuhlman developed 'Quick-Grip' to solve a particular customer's problem. It proved so successful that it was incorporated into the Kuhlman line. Today, it is universally used as the fastest, safest and most convenient way to make a line connection.

"The story continues when Kuhlman extended the 'Quick-Grip' feature above 5KV to again solve a customer's problem. This 'Quick-Grip' bushing in cover mounted design eliminates the extra expense of bird guards and other protective coverings.

"I like this success story . . . it illustrates how Kuhlman representatives and design engineers work together to solve your transformer problems. What's more—it's a story that never ends . . . for the search for better ways to meet your needs goes on continually at Kuhlman."

578d

KUHLMAN

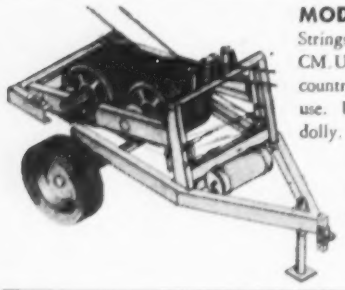
ELECTRIC COMPANY

GENERAL OFFICES: Birmingham Michigan

Partial showing of the now ***COMPLETE*** line of . . .

PENGO TENSION WIRE STRINGING EQUIPMENT

Manufactured by PETERSEN ENGINEERING CO., Santa Clara, Calif. • 14 Patents Pending!

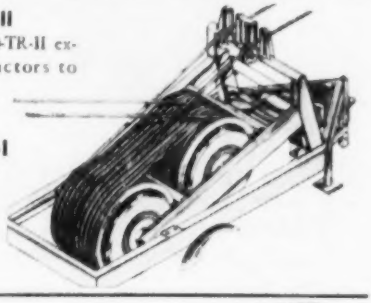


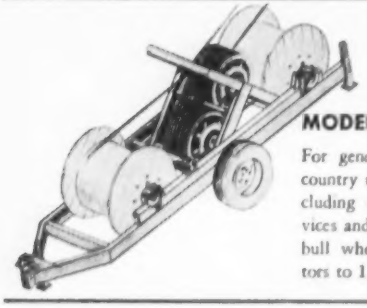
MODEL 5000-TR-II
Strings two conductors to 556,300 CM. Used primarily for very rough country work; also for general use. Use separate reel-carrying dolly.

MODEL 5000-TR-I
Similar except strings one conductor.

MODEL 6000-TR-II
Similar to Model 5000-TR-II except larger. Conductors to 1,272,000 CM.

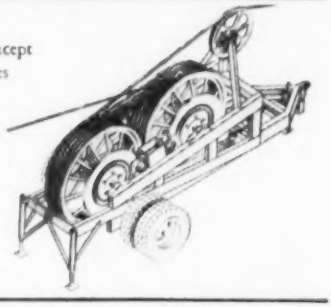
MODEL 6000-TR-I
Similar except for one conductor.

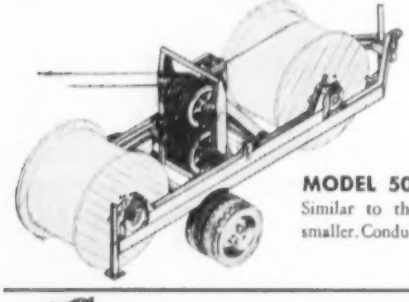




MODEL 6000-WS-TR
For general and medium rough country use. A complete unit including trailer, reel-carrying devices and its own double pair of bull wheels. Conductors to 1,272,000 CM.

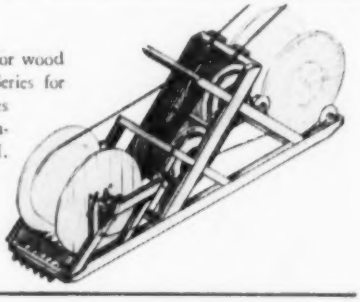
MODEL 7000-TR-I
Similar to model 6000-TR-I except larger. Conductors to 2 inches diameter.

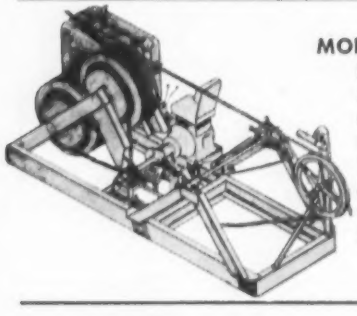




MODEL 5000-WS-TR
Similar to the 6000-WS-TR but smaller. Conductors to 556,300 CM.

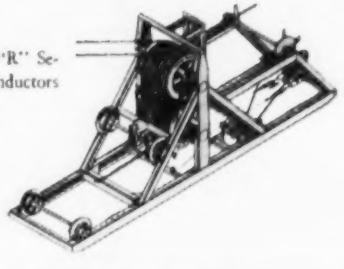
MODEL 6000-W
Available in "S" Series for wood or steel reels, in "R" Series for steel reels, or "SR" Series for trailer mounting. Conductors to 1,272,000 CM.

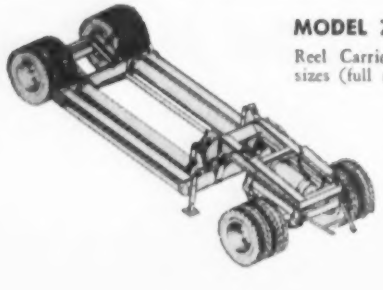




MODEL 6500
Bull Wheel Cable Puller. Available in "R" Series for steel reels, "S" Series for wood reels. Conductors to 1,272,000 CM. Also available in "LWR" Model for extra-large steel reels. Model 5500 similar (smaller).

MODEL 5000-SR
Available in "S" Series, "R" Series, or "SR" Series. Conductors to 556,300 CM





MODEL 7500
Reel Carrier. Takes the largest sizes (full range) of steel reels. Loads and unloads with one man. No auxiliary equipment needed except the truck that pulls it. For use with any one of the tensioning machines shown on this page.

ADDITIONAL MODELS NOT SHOWN

Tension Reel Trailers

MODELS 2, 3, and 4, Two-Wheel Straddle Dollies not shown. For use with any one of the tensioning machines shown on these pages.

Tension Stringers

MODELS 6000-SK-I and 6000-SK-II For one or two conductors to 1,272,000 CM. Skid mounted for installation on owner's equipment.

MODELS 5000-SK-I and 5000-SK-II Skid mounted for installing on owner's equipment. For stringing one or two conductors to 556,300 CM.

MODEL 5000-WS-III Strings three conductors to 556,300 CM. For mounting on low-bed or full trailer.

MODEL 6000-WS-III Strings three conductors to 1,272,000 CM. For mounting on low-bed or full trailer.

Two PENGO model 6000 TR-11 wire tensioners being used by Pacific Gas and Electric Co. in reconductoring job between Vacaville, Calif. and Cottonwood, Calif. 285 miles of 500 MCM copper is being replaced by 954 MCM aluminum in this operation.

Newest method of stringing overhead lines

Two PENGO model 6500 Bullwheel Cable Pullers used by Pacific Gas and Electric Co. for pulling in the new line on the job mentioned above. Unit, manned by an operator and one reel tender, pulls the pulling line (in this instance the old copper conductor) over the double neoprene lined Bullwheels and winds it for shipment in a single operation.

- **Safest, most economical way of stringing transmission, distribution and even secondary lines.**
- **Its greatest savings are effected when stringing over and through energized circuits . . . by far the safest, too!**
- **14 Patents pending!**

Smooth, postive control of conductor tension can be maintained at all times regardless of model or size of PENGO tensioning equipment used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

Note the wide range of models on the opposite page available for all types of jobs or terrain and for all sizes of conductor.

List your requirements and send for descriptive literature and prices.

Made by the makers of the World-Famous
PENGO EARTH AUGERS

PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

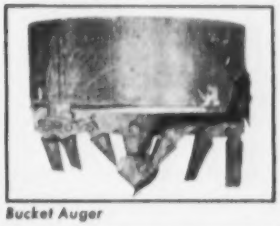
PETERSEN ENGINEERING CO.
Santa Clara, California Dept. 3
Please send me more information on the new Pengo wire stringing equipment.
Name_____
Firm_____
Address_____
City_____ State_____

Other PENGO Products include:

24 inch Heavy Duty Flight Auger

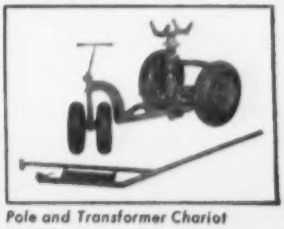
Double-Helix Heavy Duty Auger

Offset Boring Head


Bucket Auger

Screw Bit for Small Diameter Holes

Pulling Eye


Pole and Transformer Chariot

MEN RESPONSIBLE FOR

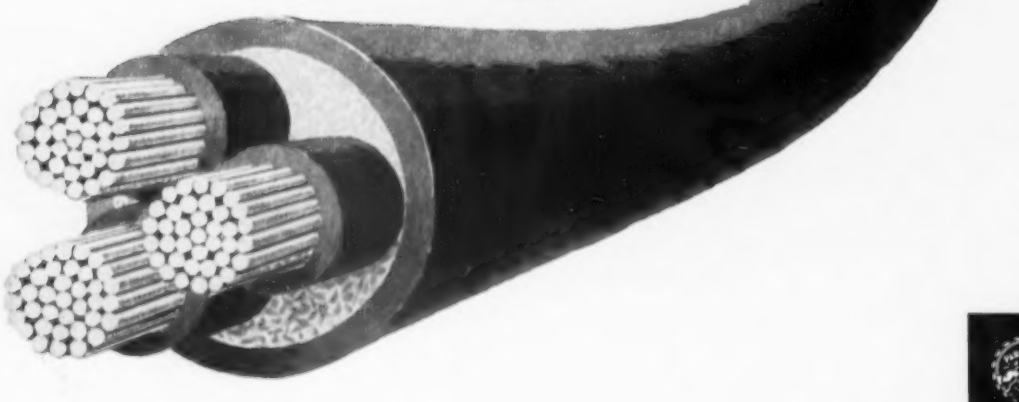
POWER DISTRIBUTION KNOW...

IF IT'S PARANITE IT'S RIGHT!®

FROM POWER TO CONTROL CABLE...

Paranite has earned an unquestioned reputation for quality wire products and dependable service! Overhead . . . or underground . . : there's a Paranite cable specifically engineered to perform in excess of your requirements. Super-Pararite® butyl rubber insulations have been developed to withstand conditions in *your* area. Copper or aluminum bare or weatherproof cables—ACSR or line wire (formerly products of Midland Wire Corporation) are available.

LIVE BETTER ELECTRICALLY



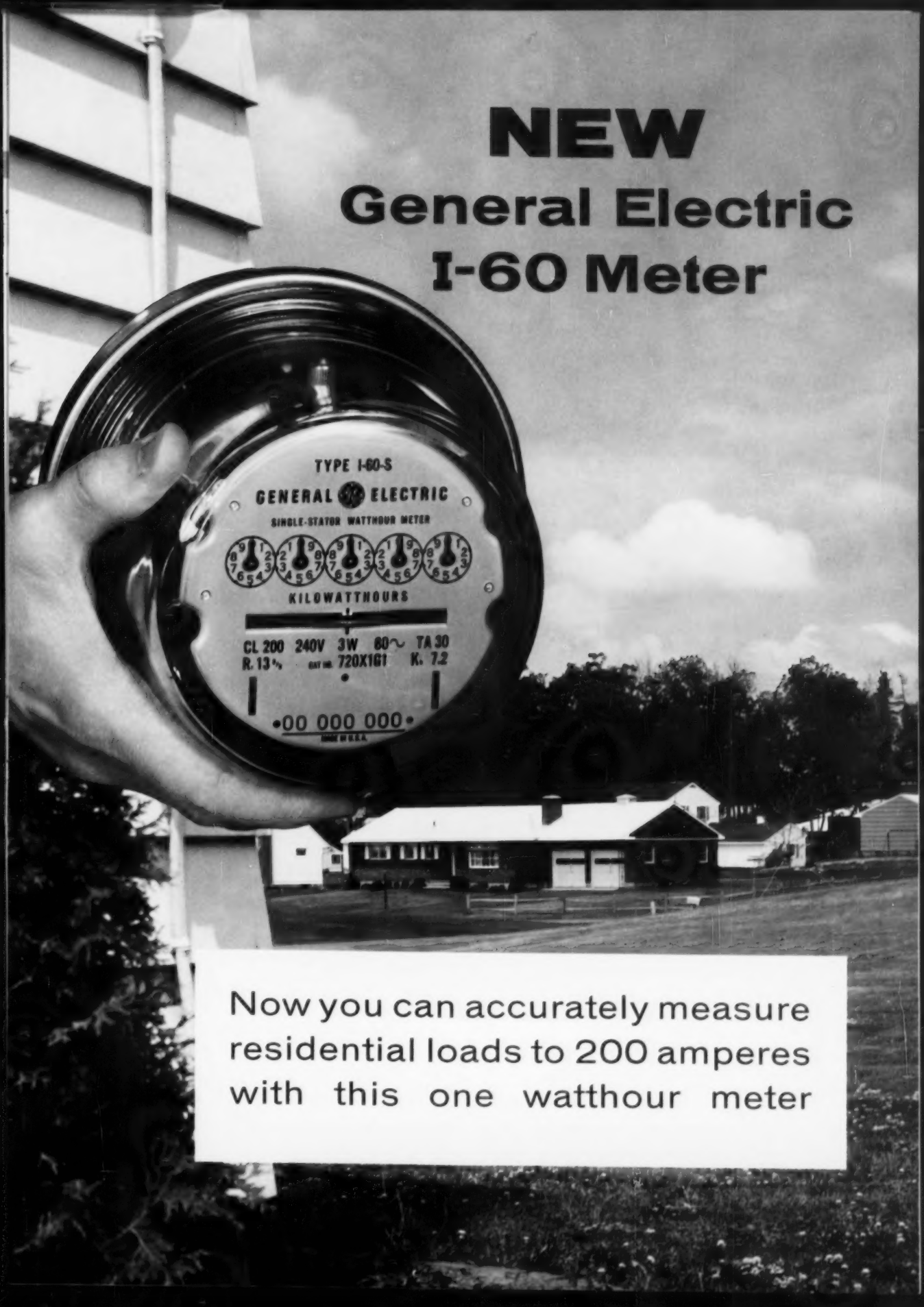
PARANITE WIRE AND CABLE

DIVISION ESSEX WIRE CORPORATION

Factory: Anaheim, California

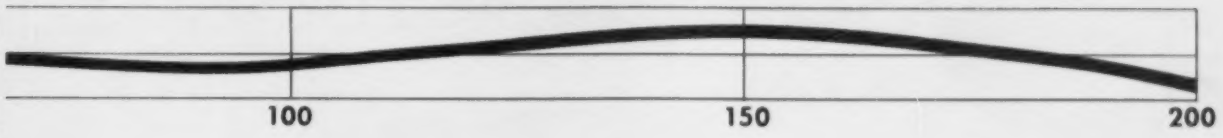
WAREHOUSES* AND SALES OFFICES

*LOS ANGELES, 6415 East Fleet Street; *SAN FRANCISCO, 1077 Howard Street;
*PORTLAND, 525 North Tillamook Street


NEW
General Electric
I-60 Meter
TYPE I-60-S
GENERAL ELECTRIC
SINGLE-STATOR WATTHOUR METER
KILOWATTHOURS
CL 200 240V 3W 60~ TA 30
R. 13⅓ 720X1G1 K. 7.2
•00 000 000•
Now you can accurately measure residential loads to 200 amperes with this one watthour meter

NEW General Electric I-60 Meter Offers You True "On-line" Accuracy All the Way to 200 Amps

for your residential loads today and in the future



FOR YOUR SINGLE-PHASE RESIDENTIAL LOADS, the new Class 200 I-60 watthour meter by General Electric gives you "on-line" accuracy at *both* light and heavy loads. This remarkable new meter was designed specifically to meet the expressed needs of metering men for a single-stator meter capable of accurately measuring loads *up to 200 amperes* with a metering investment *no greater* than for existing Class 100 meters.

PROVEN ACCURACY, UP TO 200 AMPERES, is shown by the "on-line" load curve of the I-60 meter. The outstanding characteristic of the I-60 meter is its "on-line" performance at the Class 100 meter test currents of 1.5 and 15 amps, as well as at the Class 200 test currents of 3 and 30 amps. And at a full 200 amps it stays within three-quarters of one per cent. This superior performance of the I-60 is unequalled in the history of metering.

YOUR METER INVESTMENT IS PROTECTED, now and in the future, by the low inherent cost of the I-60 Class 200 meter—an inherent cost no greater than existing Class 100 meters. A revolutionary new, lightweight stator, simple and efficient, contributes to the outstanding accuracy of the I-60 meter. This stator design allows you to benefit from substantial savings in construction and materials selection. With the I-60, you protect your important metering investment by getting a Class 200 meter *genuinely no more costly* than present Class 100 meters.

TIME-PROVEN ADVANTAGES OF MAGNETIC SUSPENSION—a General Electric development—give you greater sustained accuracy, freedom from bearing replacement, and virtually eliminate tilt-error problems. Only G-E meters with magnetic suspension bring you these benefits.

Whether you prefer Class 100 or 200 meters, General Electric has a meter to meet your needs. Ask your G-E Apparatus Salesman or Representative for all the facts on the new I-60. Write for bulletin to General Electric Co., Section 621-11, Schenectady 5, N. Y.

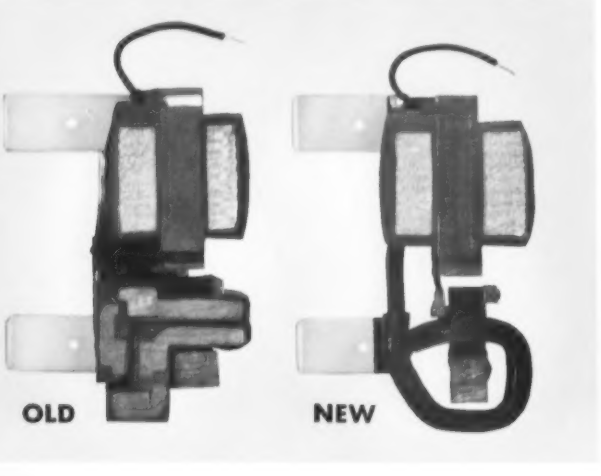
GENERAL ELECTRIC

NOW FROM GENERAL ELECTRIC

NEW Class 200 I-60 meter is inherently no more costly than present Class 100 meters

UNIQUE NEW STATOR CUTS MATERIAL COSTS IN CLASS 200 I-60 METER

A revolutionary new, lightweight stator design is incorporated in the I-60 meter, making its inherent cost equal to existing Class 100 meters. Comparing this I-60 stator to conventional Class 200 designs, there are substantial savings in copper and iron. Compromises in core designs and materials are eliminated by the simplified current coil and magnetic isolation of current and potential electromagnets. Spacing the potential-return laminations away from the current core eliminates undesirable intermingling of potential and current fluxes. Thus each electromagnet can best perform its measurement task.



The new current coil design is very simple compared to conventional split-coil designs found in other Class 200 meters. The elimination of current splitting minimizes error torques, inherent temperature errors, potential circuit losses, and undesirable effects on the phase angle of the potential flux. The new I-60 current coils are not fastened to the current core. Their new location and configuration permit optimum alignment of terminal blades in socket clips without affecting calibration. This creative engineering makes possible the I-60 meter's unprecedented accuracy all the way up to 200 amperes.

NEW I-60 OFFERS MAGNETIC SUSPENSION AND OTHER I-50 METER FAMILY BENEFITS

The benefits of magnetic suspension—a General Electric exclusive—are yours in the I-60 meter. With magnetic suspension, G-E Class 100 and 200 meters offer greater sustained accuracy, freedom from bearing replacement, and virtual elimination of tilt errors. Other I-60 features time-proven in the I-50 meter family are corrosion resistant finishes, coordinated insulation, and easy-to-read faceplate.

For complete details on Class 100 and 200 meters contact your G-E Apparatus Salesman or Representative or write General Electric Company, Section 621-11, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . Provides Lifetime Wiring Protection For Frank Lloyd Wright's Modernistic Price Tower

At Bartlesville, Okla., the H. C. Price Co.—veteran oil and gas pipeline construction firm — recently opened their beautiful, new cantilever-design Price Tower. Containing both offices and residential apartments, this 19-story, fully air-conditioned structure uses Youngstown "Buckeye" full-weight rigid steel conduit for protection of its important electrical wiring system from damaging elements such as water, moisture, vapor, dirt and dust.

Field reports across-the-nation state: "Youngstown's 'Buckeye' Conduit is easier to bend—easier to fish wires through and, due to its superior corrosion resistance, affords a much longer trouble-free service life."

Leading distributors in every industrial and electrical market are ready to serve you quickly and efficiently from their ample stocks of Youngstown "Buckeye" Conduit. They're as near as your phone—why not call today?

QUALITY YOUNGSTOWN SERVICE

Price Tower, Bartlesville, Okla.
Owner: H. C. Price Co.
Architect: Frank Lloyd Wright
General Contractor: Culwell Construction Co., Oklahoma City, Okla.
Electrical Contractor: Industrial Electric Co., Oklahoma City, Okla.
Conduit Supplier: Westinghouse Electric Supply Co., Oklahoma City, Okla.

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

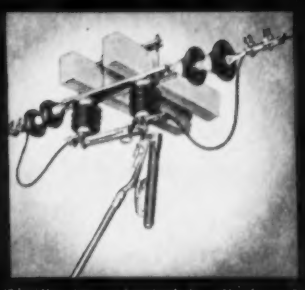
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

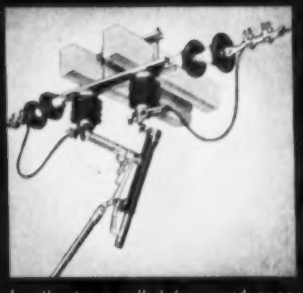
General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

NOW! low-cost load switching for your entire distribution system... just hook Loadbuster® across this new S&C Tool Operated Disconnect



Loadbuster is hooked to attachment hook of disconnect



Loadbuster is pulled downward, opening disconnect blade

Loadbuster interrupts circuit and latches open

Loadbuster freed from attachment hook; to be twisted from pull ring

That's right! Now you can make load switching universal. At the same time you get the rugged reliability you'd expect from a station-type disconnect, while paying no more than you would for distribution-type disconnects.

This new S&C Tool Operated Disconnect switches loads dependably with Loadbuster, S&C's portable loadbreak tool, and it is the only distribution disconnect with published short-time ratings and published insulation values.

Why is this published data important? Just take a look at what has been happening on distribution lines in the past few years—

Today's Disconnect Problem

Performance requirements for disconnects have risen rapidly as a result of higher voltages, 400-ampere loads, and alarming increases in available short-circuit currents. This type of duty might suggest the use of 600-ampere, station-type equipment, but distribution system budgets can't stand the cost.

Yet the job is too heavy for the ordinary distribution disconnect which has inadequate short-time capability, substandard insulation characteristics, insubstantial construction, no load switching potentiality, and extremely limited repetitive capability.

Up until now there has been no device to fill the void—no disconnect suited to a modern, high-reliability, distribution system, yet matching distribution economics. To meet this need, S&C is introducing this Tool Operated Disconnect. It meets the rigorous requirements conventionally filled by group-operated disconnects, hook-operated, station-type disconnects, and conventional load interrupters.

. . . and Load Switching Needs

Load switching is a serious problem today. Primary distribution voltages of 12-14 kv, currents of 100 to 400 amperes, and the associated charging and magnetizing currents cannot be switched without establishing persistent, spreading arcs.

Until recently, the only dependable solution to load switching needs has been the load interrupter, whose cost can only be justified at substations, subtransmission sectionalizing points, and at key sectionalizing points. Now with this new disconnect you can have universal load switching—economically—using Loadbuster.

Portability the Key

The key to the Loadbuster system of load switching lies in portability —bringing the interrupting device to a matched disconnect or cutout only when load switching is desired. The cost of Loadbusters is spread over all the disconnects and cutouts in a distribution system.

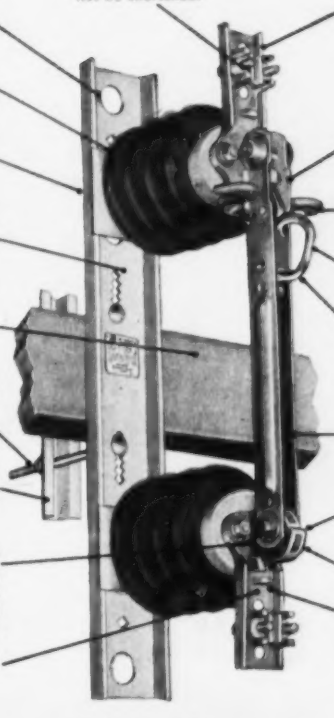
Today you can solve the disconnect problem for your system with S&C's Tool Operated Disconnect . . . a distribution device that doubles for station-type equipment. And since this Tool Operated Disconnect is matched to Loadbuster, load switching comes free! Write for full information.

How Loadbuster Works

Attached to a universal pole, Loadbuster is simply hung on the attachment hook of the Tool Operated Disconnect, and the pull ring hook inserted in the pull ring. As the pole is pulled downward, the disconnect is opened, but a current path is retained through Loadbuster. As the movement continues downward, Loadbuster trips, breaking the circuit positively. It's that easy! There's no arc, no contact burning, and no danger to the lineman operator.

Designed to withstand usage over a long time without maintenance, Loadbuster is operable at any distribution system voltage through 14,400 volts, and can break all load currents through 400 amperes, as well as associated magnetizing and line charging currents; it can also switch all pole top capacitor banks.

the new S&C Tool Operated Disconnect



Connector Bolts can be inserted in one direction only so electrical clearance cannot be shortened.

Dead-Ending Provision base has holes in each end for dead-ending conductors.

Post Insulators provide large leakage distance between live parts and base.

Husky Channel Base gives flat bearing surface against crossarm.

Versatile Mounting Provisions for single and double crossarm, also structure; all needed hardware included.

10½" Metal-to-Metal Open Gap Distance is unusually long for distribution disconnects.

Mounting Bolts extend away from blade, protect clearances to live parts.

Rigid Back-Up Members permit secure draw-up. Bolts insertable only in one direction as shown to maintain electrical clearance.

Double-Stud Insulator Mount insures against shifting or turning of live parts, particularly when closing blade from the side.

Current Path virtually a straight line.

Dual-Purpose Connectors tinned to take aluminum or copper. Large area, reversible clamp accommodates wide range of conductors—up to 450 Mcm copper and 336 Mcm ACSR.

Silver-to-Silver Contacts backed up by stainless steel contact pressure springs.

Attachment Hook for Use with Loadbuster also serves as blade guide.

Positive Latch and Pry-out operates freely from all angles of approach.

Pull Ring Position gives compact construction—with minimum clearance requirements for open blade.

Heavy, Embossed Blades insure positive alignment when closing in.

Machined Contact Surfaces for best possible contact.

Positive 90° Blade Stop

Cable Stop prevents cable end from interfering with disconnect blade action.

Only Distribution Disconnect with Published Performance Data

The performance built into this disconnect (see below) is unmatched in the field of distribution disconnects . . . and the S&C Tool Operated Disconnect costs no more. Plus cost-free load switching! Designed for use with Loadbuster®, this disconnect is, when required, a load interrupter for currents up to 400 amperes.

That this disconnect will give years of maintenance-free, urban or rural service is clear from the construction details shown at the left.

The new disconnect comes complete with all necessary hardware for both single or double crossarm mounting (vertical or inverted), for use with both aluminum and copper conductors. There is nothing extra to buy or to specify.

15 kv—400 amp

Style	Rating						Insulator Characteristics			
	Kv			Amperes			Inches		Withstand Test Voltage kv (Rms), 60-cycle	
	Nominal	Max Design	Impulse Withstand (BIL)	Continuous	Short Time Momentary	Short Time 4 sec	Leakage Distance	Dry Arcing Distance	Dry, 1 min.	Wet, 10 sec
Branch Feeder	15	15	95	400	20000	12500	13-3/4	6	50	42
Main Feeder	15	15.5	110	400	20000	12500	17	7-1/4	50	45
Station Pin Insulator	15	15.5	110	400	20000	12500	12	7-1/4	50	45
Station Post Insulator	15	15.5	110	400	20000	12500	15-1/2	7-1/4	50	45

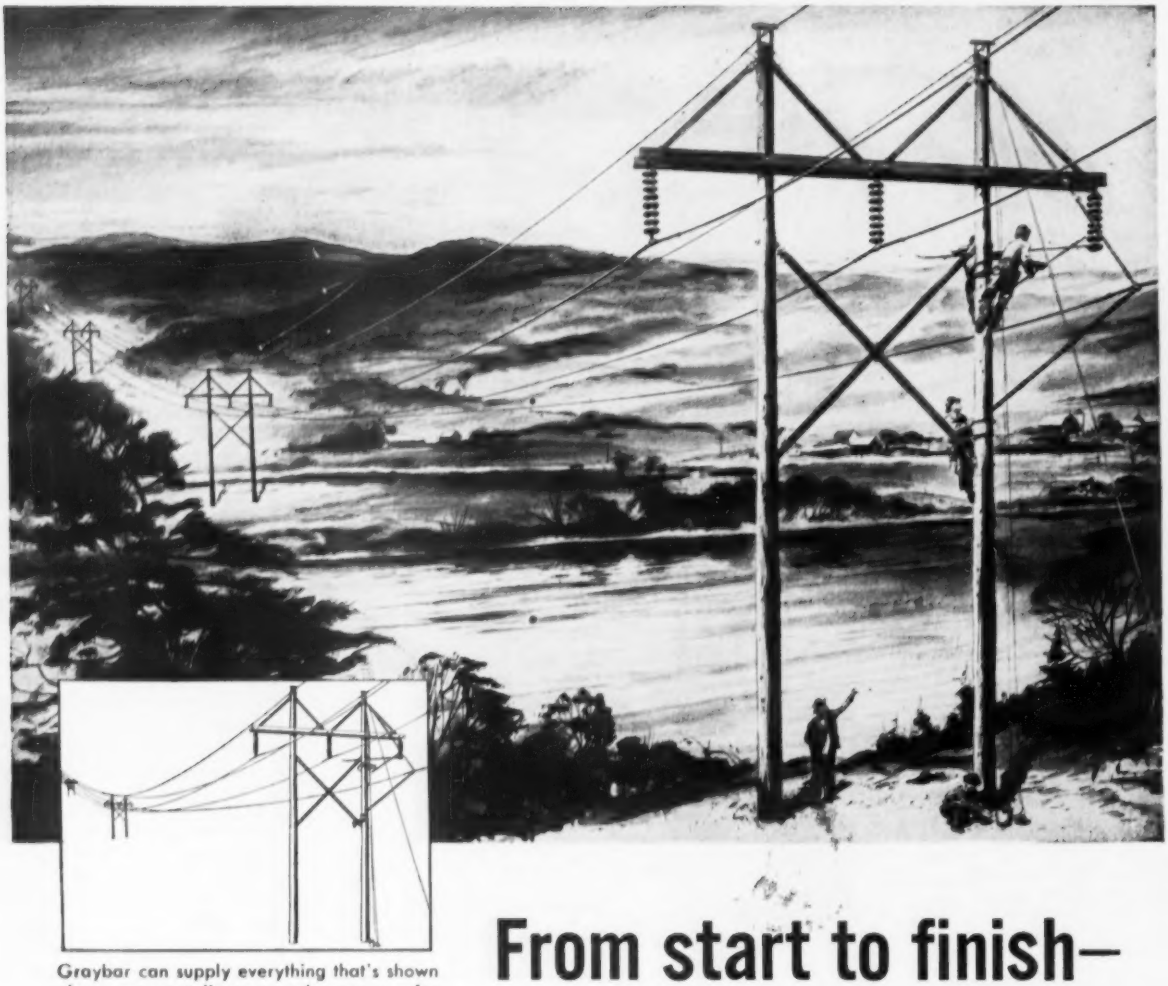
Specialists in High-Voltage Circuit Interruption Since 1910

S&C ELECTRIC COMPANY

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

4425 RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS, U. S. A.

In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario



Graybar can supply everything that's shown above — except linemen and scenery — for line construction *and* maintenance. Poles, crossarms, hardware, tools—a partial list of items that are stocked at strategic Graybar locations throughout the country. All available for fast delivery to you. It pays to call Graybar . . . *first.*

From start to finish—
arrange for continuing supplies and equipment—with Graybar

Engineers deep in the problems of new transmission *line construction* must be able to depend upon reliable, on-time deliveries to keep their schedules. And later, to meet the continuing task of *line maintenance*, the selection, dependable delivery and warehousing of supplies and equipment are vital.

Graybar backs up design and construction engineers to speed up these processes. Through more than 130 offices and warehouses, Graybar supplies prompt catalog information on everything electrical needed in line construction and maintenance.

To speed up the selection and delivery of anything and everything you need for line construction and maintenance call Graybar first. *Graybar Electric Company, 420 Lexington Avenue, New York 17, N. Y.*

713-810

CALL GraybaR FIRST FOR

GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK, IN OVER 130 PRINCIPAL CITIES

GET ON THE PROFIT CIRCUIT WITH TITAN

tops in high wattage heater sales with

HI-HEAT
HI-STYLE
HI-QUALITY and low, low PRICE

new TITAN Completely Automatic HI-WATT HEATERS

Now Titan offers you three profit-proven Hi-Watt Heaters for Hi-Volume Selling. With Titan you offer your customers MORE value, MORE features, MORE heat, MORE styling, MORE efficiency . . . all for LESS money. That's why Titan is the fastest-selling line in the field. And that's why Titan offers you more profit opportunities than any other line.

TITAN PRE-SELLS YOUR CUSTOMERS with the most powerful promotional program in TITAN history. And TITAN gives you FREE ad mats, product literature, folders. STOCK . . . FEATURE . . . SELL the well promoted TITAN line.

The Only High Wattage Heaters with **ELEMENTS UNCONDITIONALLY GUARANTEED for 10 YEARS** of Trouble Free Service

Compare these Features with ANY High Wattage Heaters

- HEARTH-SIDE COMFORT FILLS ANY ROOM
- PRECISE AUTOMATIC THERMOSTAT CONTROL
- AUTOMATIC TEMPERATURE LIMIT and INSTANT, SAFETY SHUT-OFF CONTROL
- LIVE POWER SIGNAL LIGHT
- SUPER-SILENT FAN-FORCED CONVECTION HEAT
- MAXIMUM EFFICIENCY EVER-COOL CASE
- DURABLE PEARLIZED BAKED ENAMEL FINISH
- 10 YEAR ELEMENT GUARANTEE
- 1 YEAR GUARANTEE ON MATERIALS and WORKMANSHIP
- UL TESTED and LISTED

TITAN HI-WATT HEATERS — Model 66 ... 3,000 Watts; Model 67 ... 4,000 Watts; Model 68 ... 4,600 Watts — All 230 Volts, 60 Cycle, AC

Introducing

A TOTALLY NEW APPLIANCE

TITAN HI-V Convertible

HEATS in Winter . . .
COOLS in Summer

Write for further information on the TITAN CONVERTIBLE and the rest of the fast-selling TITAN Line.

TITAN SALES CORPORATION • BUFFALO 10, N. Y.

DECIDEDLY BETTER
DAY-BRITE
Lighting Fixtures

Electrical contractors Cal Gilbert and Harry Becker of Gilbert & Stearns, Santa Ana, California

"True alignment . . . greater savings"

For over 30 years we've been looking for ways to do jobs better with simpler and less expensive methods. It wasn't until our first Day-Brite job that we really had something to talk about.

"Day-Brite 'A-J' hangers showed us how much time we could actually save on installation. Fixture runs of more than 200 feet finished out with true alignment and considerable savings on labor.

"Day-Brite packing is so complete that extra on-the-job assembly is eliminated. The excellent finish on Day-Brite fixtures reduces to a minimum the scratches, chipping and peeling we usually experience with other units.

"Yes, we're great Day-Brite boosters. On every lighting job we engineer, these are the fixtures we specify and use!"

It's hard to top enthusiasm like Mr. Becker's! Like to feel that way about a fixture, yourself? Specify Day-Brite and see.

DAY-BRITE LIGHTING, INC., OF CALIFORNIA,
530 Martin Ave., Santa Clara, Calif.
71196

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

NEW TWO-STATOR NETWORK METER

New economies with Sangamo Type P2S for your fast growing polyphase loads

APPLICABLE TO SMALL LOADS AND LARGE ONES. Range extended in both directions permits meter to start at ¼% of rated load yet operate continuously at 666⅔% of rated load with a maximum temperature rise of 50° C. Gives economies through increased range of application.

APPLICABLE TO SERVICE OF MANY VOLTAGES. Accurate registration without special calibration is provided for circuit variations from 42% to 125% of rated voltage. A single meter, the 240 volt P2, may be used on 120/208, 240/416 and 277/480 network systems, and also on 3 wire 3 phase and 3 wire single-phase circuits. Gives economies through reduced stocks.

TIME SAVED IN ADJUSTMENTS. Only four adjustment points—full load, light load, balance, and power factor—reduce testing and calibration time.

SAVINGS IN HEIGHT AND COVER REPLACEMENT. The Sangamo P2S Meter has been substantially reduced in height. The cover is the same as that used on all singlephase metal base socket meters manufactured since 1936.

PROVEN ECONOMY THROUGH SLOW SPEED. Sangamo *slow speed*—proved so successfully on the singlephase Type J2 Sangamo Meter—gives even greater benefits in two-stator meters. Reduced series damping and fewer revolutions just naturally mean greater accuracy and better performance.

Sangamo Type P Meters will be available for measurement of all types of polyphase service.

SANGAMO *Electric Company*
SPRINGFIELD, ILLINOIS

*Patents applied for

• Small, light in weight, and easy to maintain.

The extensive experience of Delta-Star engineers in power and distribution equipment now brings you the latest developments in pole-type distribution transformers.

All new—from original concept to crating—Delta-Star Transformers incorporate every new improvement in transformer design. Included are a new core, a smaller coil, improved insulation, corrosion-resistant tank design, and a high-strength shipping crate.

Delta-Star Transformers, built to NEMA standards, are available in single-phase ratings from 3kva to 167kva, in standard voltages through 15,000v.

For complete information, write to H. K. Porter Company, Inc., Delta-Star Electric Division, 17th & Cambria Sts., Philadelphia 32, Pa.

H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION

Porter Divisions: Cleveland, Connors Steel, Delta-Star Electric, Henry Disston, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan Crucible Steel, W-S Fittings, H. K. Porter Company (Canada) Ltd.

Letters to the Editor

Exceptions

To the Editor:

Apropos your editorial in the August issue I, too, was amazed at the lack of industry-wide *public* support of Idaho Power Co.'s position. Of course there was a good deal of talking among ourselves but that is quite fruitless.

At any rate, just to keep the record straight and to be "the exception that proves the rule," I'm enclosing an answer I wrote to criticism. It was published in both Salt Lake papers and copies sent to the members of Utah's congressional delegation.

Just why the electrical industry—and in fact industry in general—is so bashful (perhaps cowardly is a better word) about standing up to be counted on such vital issues is quite beyond my ken.

Your editorial was very much in order and I hope does some good. . . .

Paul P. Ashworth
Executive Vice-president
Telluride Power Co.
Salt Lake City, Utah

To the Editor:

The attached will encourage you that there are people in the electric utility industry who are willing to "Stand Up and Be Counted" as suggested by your forceful editorial in the August issue of ELECTRICAL WEST.

May I suggest that what you are asking requires considerable effort as it often takes a page to refute one small paragraph of public power propaganda.

Sincere congratulations on that excellent editorial and the space given Tom Roach.

E. A. Nickelsen
Commercial Manager
California-Pacific Utilities Co.
San Francisco

Mr. Ashforth and Mr. Nickelsen did stand up to be counted. Forthright letters to the editors of their local newspapers presented unqualified support for Idaho Power. We need more.—The Editor.

To the Editor:

I just read the Tom Roach article and your editorial comment in the August Electrical West and it is hard to understand how the public can be blind to the beating Idaho Power has taken.

Decent responsible people in Oregon are ashamed of our headline-hunting senators who attempt to wreck industry for political expediency.

William Hard's article in August *Readers Digest* is on our side and is rendering a service to the Northwest.

Laurence Mann
President
Portland Printing House Inc.
Portland, Ore.

Misleading

To the Editor:

Our attention has been called to the item in your July issue of ELECTRICAL WEST captioned "Testing."

By publishing the conclusions of the two General Electric gentlemen, without briefly outlining the specific applications under discussion, you are misleading many of your readers.

Low direct voltage testing made possible by insulation resistance testers has proved to be sound practice. As an insurance company, our inspections of electrical machinery include routine insulation resistance tests. Over the last two decades it has been possible to predict impending breakdowns with insulation testers, even of high-voltage apparatus, making it possible for our policy holders to repair or replace important machines on a planned basis rather than on a forced outage.

With respect to high direct voltage testing, we feel that our experience has not extended over the field for a sufficiently long duration to arrive at definite opinions. . . .

R. E. Valentine
Supervising Engineer
Ocean Accident & Guarantee Corp. Ltd.
New York, N.Y.

Tax System Too

To the Editor:

Your editorial "Stand Up and Be Counted," which appeared in ELECTRICAL WEST for August, impressed me as one of the best I have seen. I agree that we need a much larger number of those who are willing to take the trouble to make their voice heard under conditions such as you describe.

This is one of many conditions in which the federal government seems to be encroaching on individual liberties. One of these other areas is the present system of income taxation.

Not only are the taxes exorbitant but the system of collection requires the businessman to supply, free of charge, all of the clerical work required for accounting purposes. Moreover, it seizes the pay of the individual before it has even reached his hands; and no less person than Mr. Eisenhower has suggested that this is probably illegal.

I am told that a certain Vivian Kellems, a businesswoman in the east, has tried to take legal action against this system and, apparently, has received no more support from others than the Idaho Power Co. has in the case you mentioned. . . .

M. G. Leonard
Section Manager
Distribution Transformer Division
Westinghouse Electric Corp.
Sharon, Pa.

An Enormous Task

To the Editor:

Upon my return this week from vacation, one of the first items I found on my desk was the excellent editorial entitled "New Reading" in your fine publication for July. I certainly subscribe 100% to the conclusion in the last paragraph. In fact, I firmly believe that the attitudes of people in the Northwest are just like those of people throughout the nation.

The task of meeting the needs of the people in the region is enormous even today and it is staggering to think how much greater it will be in the years to come in view of the growth that is already under way and gathering momentum all the time. In that connection, I thought you might like to see a copy of a brochure just off the press, which gives a rather concise picture of the performance to date as well as the future responsibility of the Puget Sound Utilities Council. I think you will find it an interesting supplement to and evidence of the basic philosophy revealed by our recent survey which your editorial covered so incisively. . . .

Frank McLaughlin
President
Puget Sound Power & Light Co.
Seattle, Wash.

Need Popular Clamor

To the Editor:

The last sentence of "Muggy and Warmer," on p 75 of the July ELECTRICAL WEST, challenged the electrical industry to close ranks and fight with every resource under its command. America's Independent Electric Light and Power Companies continue to cry in their beer against competition by tax-exempt public-power systems, as on p 16 of the current (Aug. 17) *Saturday Evening Post*.

Electric power is not the only industry suffering from, or threatened by, government competition. The electrical industry should join ranks with other industries and fight with the resources at their command.

Immediately after the 85th Congress convened last Jan. 3, House Joint Resolution No. 123 was introduced, proposing an amendment to the Constitution, to prohibit the United States government from engaging in business in competition with its citizens. What more could private industry desire than such an amendment?

Shortly afterward, on Feb. 14, 1957, H. J. Res. 232 was introduced, proposing an amendment to the Constitution to repeal the 16th (income-tax) amendment. What more can private citizens want than such an amendment?

Opponents of the repeal, led by Daniel A. Reed (N.Y.), the ranking Republican member of the House Ways and Means Committee, loudly asserted that the government needs the revenue from income taxes. For what?

Advocates of H. J. Res. 123 and H. J. Res. 232 readily demonstrated that the elimination of income-tax revenue would be more than offset by (1) proceeds from the sale of government-owned industrial facilities; (2) eliminating the cost of operating and maintaining those facilities; and (3) the revenue from said facilities after they are restored to tax-paying status.

To capitalize on the mutuality of their objectives and to assure concurrent enactment, H. J. Res. 123 and H. J. Res. 232 have been merged into H. J. Res. 355, which was introduced on July 10, 1957. Each of these three resolutions has been referred to the House Committee on the Judiciary, of which the chairman is Emanuel Celler (Dem., Brooklyn, N.Y.)

I understand Mr. Celler has said that there is not enough public interest to justify committee hearings on these resolutions. Regardless of the truth of that assertion, it means that the resolutions are pigeon-holed at least until the second session of the 85th Congress convenes next January.

In the meantime, it behooves both the industrial press and the public press to close ranks, and to develop a popular clamor for the enactment of these necessary amendments to the Constitution of the United States.

Lloyd N. Robinson
Seattle, Wash.

IF IT CARRIES CURRENT, KW CARRIES IT!

NEW LAYTEX-RESIN INSULATION GIVES KW CONTROL CABLES FINEST PROTECTION MADE!

Greatest Insulation Advance in 25 Years!

Now with new "Kaiser Master" Control Cables, KW brings you *Laytex®-Resin* . . . the greatest advance in insulation since the introduction of pure-rubber Laytex insulation in 1932.

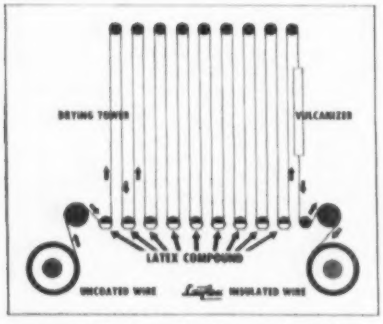
In Laytex-Resin, the synthetic resin conductor covering becomes an integral part of the insulation. The resin is applied in the same dip process as the Laytex, and is fused right into the rubber. This eliminates the need for protective braid covers, which in turn permits greatly reduced cable diameters!

In addition to smaller diameter and resulting lighter weight, Laytex-Resin cables offer all these other advantages over cables with braided conductors:

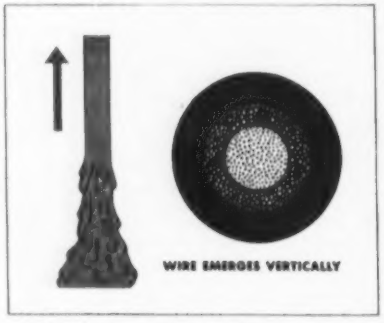
1. **More complete (100 per cent coverage) protection of the insulation.**
2. **Greater protection of the insulation against acids, alkalies, flame, fungus, moisture, oil, ozone and light checking.**
3. **Cover does not fray or wick moisture.**
4. **Splicing and taping made easier.**
5. **Smoother conductor surface.**
6. **More attractive colors (including stripes).**

For a record of dependability in municipalities all over America, KW Laytex-Resin Control Cables are backed up by twenty-five years of perfect service given by their predecessors, Laytex insulated control cables.

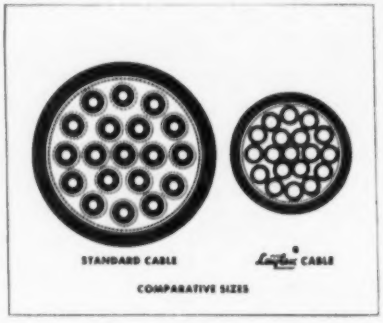
KW "Kaiser Master" Control Cables more than meet the standards set up by I.M.S.A. Specifications No. 16. These cables have tinned or alloy-coated solid copper conductors in accordance with A.S.T.M. requirements. The choice of an overall protective covering for these cables is determined by the customer and is governed by conditions of installation and use.



Laytex-Resin is applied to each individual conductor by the dip process diagrammed above. Because the rubber is applied in unmilled form and the resin is bonded directly to it, Laytex-Resin insulation has no "grain"—its physical properties are *uniform in all directions.*



In the dip process, the conductor emerges vertically from the liquid compound, forming the compound in uniform layers around the conductor. This results in a perfectly centered conductor and permits an insulation with thinner walls than are possible with extruded rubber.



Because the wall thickness required with Laytex-Resin is only one-third to one-half that required for conventional insulations, and because braided conductor covers are eliminated entirely, Laytex-Resin makes possible *more wires per conduit* . . . plus reduced weight and increased flexibility.

The properties and the performance demonstrated by KW Laytex and Laytex-Resin Control Cables all add up to unequaled *Dependability*. These cables may be installed (1) in conduits, ducts or trays, (2) as aerial cable on a suitable messenger, or (3) buried in the ground.

For immediate service, or for further information and samples, call the Kaiser Aluminum sales office or the KW distributor listed in your telephone directory. Kaiser Aluminum & Chemical Sales, Inc., *Executive Office*, Kaiser Bldg., Oakland 12, Calif.; *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.

Kaiser Aluminum

IF IT CARRIES CURRENT, KW CARRIES IT!

ELECTRA'S HUSBAND

"Take Pen in Hand"

THE dedication had been a complete success and our congressman, who had been the principal speaker, was accepting the congratulatory remarks of members of the audience. When the crowd had thinned out, I sidled up to him and suggested that he permit Electra and me to drive him to the airport. Not much later we were sitting in the Skytop lounge awaiting the departure of his flight.

Electra, who never misses an opportunity to gently needle the conversation, looked at our representative admirably and said: "I just don't understand how you can vote so intelligently on all of the issues that must come before you in a session of Congress."

"It's really not as bad as it must appear," said our congressman modestly. "Before a bill gets on the floor, it has had pretty close scrutiny between public hearings and committee activities. Most pieces of legislation represent a fairly well-rounded cross section of public and legislative thinking before they reach the stage of the final vote."

"Still," persisted Electra, "you have to make the decision as to whether to vote for or against the measure. It's pretty obvious that even though a bill reaches the voting stage, it's not necessarily a good thing for the public generally."

"That's true," he replied, "and on debatable issues, the congressman has to rely a good deal on common sense, background, a knowledge of the district he represents, and as much grass-roots' opinion as he can muster."

"And speaking of grass-roots' opinion," I interjected, "do you really get very much of that?"

"Not as much as we would like," said the congressman, "and when we do get it, you are liable to be haunted by the fact that it may be merely the expression of an articulate minority. But after you are in Congress a little while, you can, almost by a sixth sense, determine whether the messages you receive are genuine or merely inspired by some small group that has an axe to grind. The thing that most congressmen are suspicious of are droves of telegrams all very similarly worded and all for or against some piece of legislation. It's been proved time and time again that telegrams can be abused. Most of my fellow congressmen very much more appreciate a letter with a genuine signature. That way you feel that somebody was steamed up enough to take the time and effort to do more than just agree to have his name signed to a 'canned' telegram."

"I guess I'm a poor citizen," mused Electra, "because I have never written to you or any other congressman expressing my opinion on anything—my husband will probably say now that I certainly have plenty of opinions to spare. But it seems almost like a futile gesture to be one of perhaps millions of people who might be doing the same thing."

"Not at all," stated our guest. "In the first place congressmen are profoundly affected by messages from their constituents. In the second, you're not one among millions but actually perhaps one among a few hundred who really take the time and effort to express their viewpoints. The average member of Congress gets about 200 letters a day. Every one of them may represent three or four potential votes. He tries to answer each and every letter within 24 hours if he can. If they get more than their usual quota on any one subject, they really begin to pay attention as to what the people are thinking on that particular issue. It might surprise you to know that almost half of each day in a congressman's life is devoted to reading his mail and dictating replies to it."

"I never thought about it before," giggled Electra, "but maybe your letters are like a movie star's fan mail — a measure of popularity. Would you begin to worry if your quota began to fall off?"

"I certainly would and, more important than that, I would feel that I had lost touch with the people of my district. That could be the cue to take the next plane home and start mending some fences."

"Just what is the best way to make an impression on your congressman when you write to him?" asked Electra.

"Actually it's the contents that count, but every congressman is impressed when he gets a well-typed letter on thick bond paper with a legible signature and an address that is definitely within his district. We are always flattered when our names and titles are correctly used in addressing the letter and naturally we like to have the letter as brief and to the point as possible. Sometimes people ask us to present information to committees that are studying some pending legislation. You can send this along with your letter or you can ask him when you could appear in person before the committee.

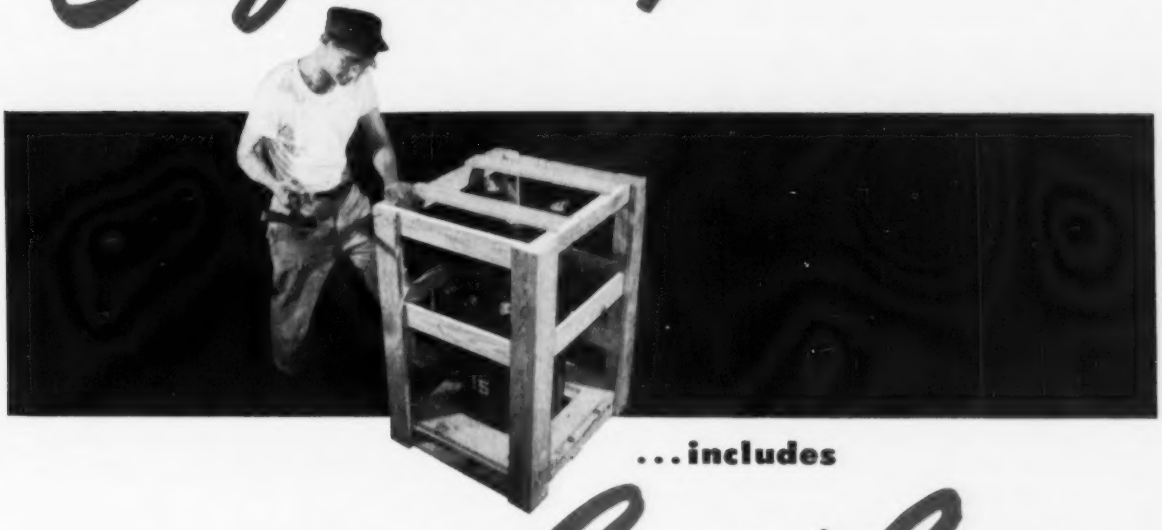
"It's also valuable to tell a little bit about yourself and your connections in the community. However, the point I want to make is that any letter is important and does its little bit toward helping formulate a congressman's opinion one way or the other."

"It sounds easy," said Electra. "I think that you'll be hearing much more frequently from me in the future."

Boarding instructions were just coming over the loudspeaker but I saw a chance, for once, to get the last word in. "There's one thing that you forgot, Electra," I said smugly, "and that is that it's not always necessary to write a congressman about your opinion. I think even a more important thing is to write him a thank you note when he votes along the lines that you favor. A note of appreciation, multiplied many times, can make quite a harmonious concert."

"Well you both have some fine ideas," said the congressman, "but the main thing is we do like to hear from you. Good-by and good writing."

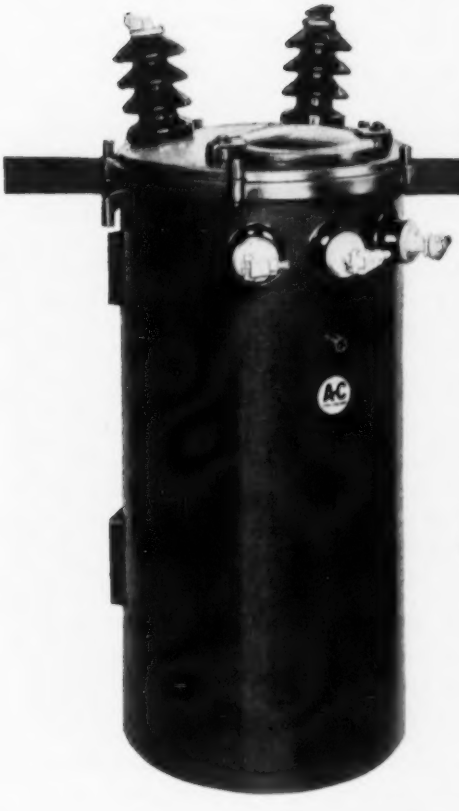
Craftsmanship at Allis-Chalmers



...includes

Careful Crating

of Distribution Transformers



Advanced engineering and manual skill at Allis-Chalmers extend even to the crating operation. Exhaustive shock tests of crate designs combined with care in manufacture assure safe arrival of shipments . . . protect the outstanding performance and long life built into every Allis-Chalmers distribution transformer. You save time and money in handling costs, as sturdy construction of crates keeps damage to a minimum. Each crate bears the seal of approval by the National Safe Transit Committee.

Pallet base facilitates safe, easy handling

The pallet base of the Allis-Chalmers transformer crate affords the speed, convenience and safety of fork truck stacking . . . promotes maximum utilization of valuable space. Because of its sturdy construction, the crate base may be reused for your own materials handling and storage.

For the complete craftsmanship story, see your Allis-Chalmers representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5487

editorial views

Farm Better Electrically

THE Farm Better Electrically program, announced early this year, is beginning to roll. This program is an all-industry effort to bring to the attention of the modern farmer the labor-saving and profit-making possibilities of putting electricity to work for more productive farming. It is a natural corollary of the Live Better . . . *Electrically* program.

There have been many programs aimed at farm electrification. Old-timers in the industry will remember the early days of the Committee on the Relationship of Electricity to Agriculture. Throughout the years, the colleges and universities of America have devoted much time and effort to educating future farmers on the benefits of electrical applications. At the same institutions, many of the theoretical applications have been translated into practical realities.

The need for improved farming methods has been recognized for a long time. The education necessary to create a demand for electrical applications has been in process for a number of years. Now, under the new "Farm Better Electrically" program coordinated selling of this large and important market becomes practical. The first part of the program will inform the farmer about many practical applications— a broadcast of information about modern methods and modern equipment. The second part will consist of a series of promotions designed especially for use in agricultural and educational agencies in planning farm power use programs and for manufacturers and power suppliers in planning direct sales activities.

Details of the program are contained in a booklet prepared by the Farm Better Electrically Program and entitled "A Program of Progress for the Farmers of America." All agencies, whether they be electric power suppliers or farm use groups, are invited to participate in this new national program which cannot help but have a beneficial influence on an important segment of the American economy. Western organizations that are interested in participating may write this publication for further details.

New Dimensions

RAPID growth of the American economy requires a continuous reappraisal of speed and direction of our journey into the future. A new report from the 20th Century Fund highlights many of the milestones and guideposts of that journey. One of the most significant and thought provoking of the latter is the shift in emphasis on conservation of natural resources. While the report strongly urges sparing use and intelligent conservation of basic assets, such as land, minerals and forests, it likewise points out that modern technology has changed the concept that the country has only a central store of irreplaceable raw materials which, once used up, will be gone forever.

Synthetics have moved in to long delay the time when many of the natural raw materials will be used up. More and more, materials for today and tomorrow are being created to order and it is literally true that technology can create practically any wanted material to specification. Better yet, this same technology uses air, water, sand, vegetable pulp and metals from the sea that are available in almost unlimited quantities. Even the bugaboo of fossil fuels is fast receding as fission and fusion become closer to practical reality. Better still, the report predicts, the long-term trend indicates a much shorter average work week for the people who will enjoy all of these new goods and products.

All this is very fine were it not for one fact. Along with all this advanced technology, which seems to assure abundant comfort and leisure in the future, there will be an accompanying trend toward mass standardization of homes, food,

transportation and all of the ingredients that make up modern living. Mass standardization can affect the individual, too, particularly if the added leisure time is devoted solely to spectator participation in mass entertainment media. Perhaps it's time for the country to begin undertaking the development of a new technology which will lead to the creative use of the leisure that is promised. The future will need individuals as well as efficient producers. And individuals are one item of the country's raw materials that cannot as yet be produced synthetically.

Versatile Gas Turbines

GAS turbines, one of the newest of the prime movers, is a fast economical way of producing peak kilowatts. Experience, both here and abroad, has increased its capacity to a respectable five-figure value. The accumulating hours of usage confirm its reliability. Elsewhere in this issue (p 103) there is an article on the application of gas turbines for peak power requirements.

Early out of the experimental stage are other applications for this versatile unit, which seems to offer improved economies from the conventional steam cycle. These range all the way from merely providing combustion air for a large steam generator to the use of pressurized furnaces that become combustion chambers for the gas turbine as well as generators of high pressure, high temperature steam. This latter combination is reported to offer from 6 to 8% thermal gain at approximately the same cost per kilowatt of installed capacity. It comes at a time when the slope of the coal rate curve was approaching the horizontal.

Here in the West, where fuels are preponderately liquid or gaseous, it would seem that the gas turbine has a rosy future, particularly if it can live up to its predicted performance in combination with modern thermal cycles.

I HAVE today approved H. R. 8996, authorizing appropriations for the Atomic Energy Commission. This bill provides authorizations as requested by the commission for its projected program. It is a great improvement indeed over the bills introduced early in the session, which would have required the commission to build and operate a number of full-scale power reactors at a cost for construction alone of $400,000,000 of public money. I am glad that Congress saw the undesirability of proceeding with that program.

The bill includes a provision directing the commission to proceed with design and engineering studies for two reactor types, both of which the commission considers unnecessary and undesirable at this time — a plutonium production reactor and a natural uranium gas-cooled power reactor — and to report back to Congress by April 1 next.

While I am not opposed to such projects as studies by the commission, I wish to make it clear that I will oppose the expenditure of public money for the construction and operation by the government of any large-scale power reactor, or any prototype thereof, unless private enterprise has first received reasonable opportunity to bear or share the cost. This comports with the precept in the first chapter of the basic law, which declares that the policy of the United States shall be to "strengthen free competition in private enterprise."

—Statement by Dwight D. Eisenhower, President of the United States.

TRANSIENT NETWORK ANALYZER supplies data for a joint G.E.—American Gas & Electric Co. study of transmission tower lightning flashovers on a 345-kv line. L. to r., W. S. Price, AG&E Service Corp., G.E.'s J. G. Anderson, High Voltage Lab., and W. F. Skeats, Switchgear Development Laboratory.

How General Electric is helping 50 utilities conserve engineering manhours this year

By providing computational equipment and associated engineering assistance, General Electric is helping approximately 50 electric utilities solve individual system problems during 1957. Thus, these utilities—representing over one-third of the nation's generating capacity—are accomplishing more per engineering manhour.

This service originated over 40 years ago, when General Electric first offered a d-c network analyzer—the forerunner of modern system-analyzing equipment—for utility use. Since then, General Electric has led in the development of analytical tools and techniques for investigating utility systems.

Through the years, the growing facilities in Schenectady have been applied to study virtually every type of utility problem. As a vital aid to utilities in setting up such studies, General Electric offers the services of experienced analytical, application, and development engineers from headquarters, district offices, and laboratories throughout the Company.

Since General Electric also uses these computational tools to further improvements in basic system engineering concepts, the entire electric utility industry benefits from their use. For more information on how these General Electric facilities can help save engineering manhours for you, contact your local General Electric Apparatus Sales Office. General Electric Company, Section 301-362, Schenectady 5, N. Y.

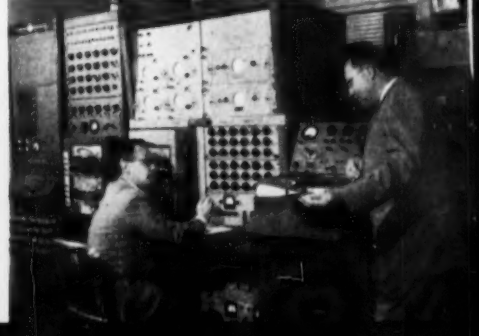
MORE POWER TO AMERICA

GENERAL ELECTRIC

A-C NETWORK ANALYZER helps Florida Power Corp. determine future construction requirements for its system. L. to r., M. F. Hebb, Florida Power Corp., G.E.'s J. C. Hartley, Atlanta Application Engrg., and R. D. Wood, Analytical Engrg.

ELECTRONIC COMPUTER quickly solves utility power loss problem conducted by G.E.'s A. J. Glimn (center), Analytical Engrg., and Ruth E. Callaghan and H. N. Cantrell, Large Steam Turbine-Generator Engrg. Calculations Center.

ELECTRONIC DIFFERENTIAL ANALYZER is employed by F. S. Rothe (left), Analytical Engrg., and M. Temoshok, Engrg. Planning and Development, to calculate data leading to improved excitation systems in generators for utilities.



ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U.S. VOL. 119 NO. 4 OCTOBER 1957

PLACE, TIME, POSSESSION—these are the factors that embrace a new concept of production . . .

The "Value Added" by Distribution

Ken P. Rehwaldt*
General Electric Supply Corp.
Los Angeles, Calif.

Too often the distributor, sometimes referred to as the jobber or wholesaler, is criticized as the middleman who reaps a profit on what others produce. This criticism results from a misunderstanding of the real value of distributive functions. The middleman is really many people performing many distributive functions in getting goods to people, in serving human wants and needs. Were it not for the performance of these functions our economy could collapse overnight.

To most people it is obvious that manufacturing adds value to raw materials because it changes their forms, converting them into specific products that are usable by the public. But distribution also is a basic value-adding function. It makes possible the *possession* of goods *where* and *when* those goods are needed. Perhaps distributors, providing a basic and necessary function of American economy, have failed to sell the value of their services.

NAED's executive director, Arthur W. Hooper, said in his Ten Steps to Better Distribution: "The first step is the need to sell the value of distribution. In the unique but necessary position of connecting consumption and production, the distributor must have the recognition and understanding of the manufacturer and the customer if he is going to be able to improve the service he renders. Step one, then, suggests that distributors launch an aggressive program to show the manufacturer and customer why the distributor is an essential element in the electrical trade channel."

I know that we'll all agree that we should continue to sell the value of our services to manufacturers and to our customers; however, I believe that we should, with equal enthusiasm, sell our services to our own employees, the public and the government.

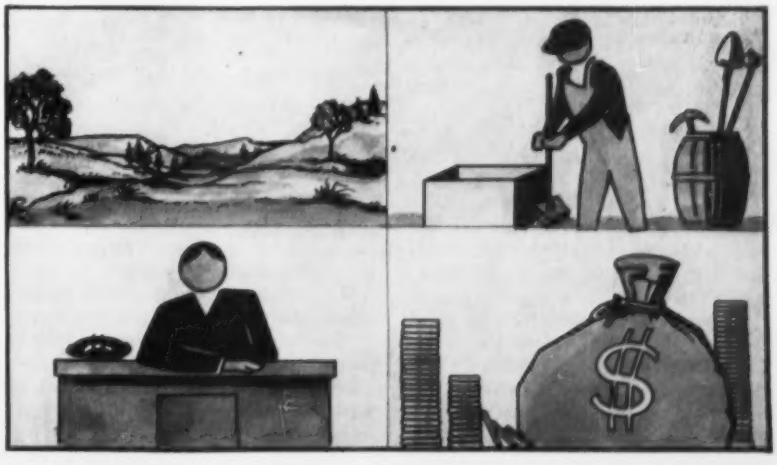
Certainly, to give proper emphasis to the economic needs of electrical distributors, we must acquaint and *reacquaint* all of our key people with reasons for being in business. Once we fully understand our functions, we surely will attach proper "added value" to the goods we distribute. Most certainly, let us dispense with the philosophy of, "All we have to do is bill it," or, "All we have to do is handle the paper." *This philosophy simply does not apply.*

Since I suggested that we consider a program of education of our own employees, you are probably wondering—what can we say or show to them?

Popular Misconception

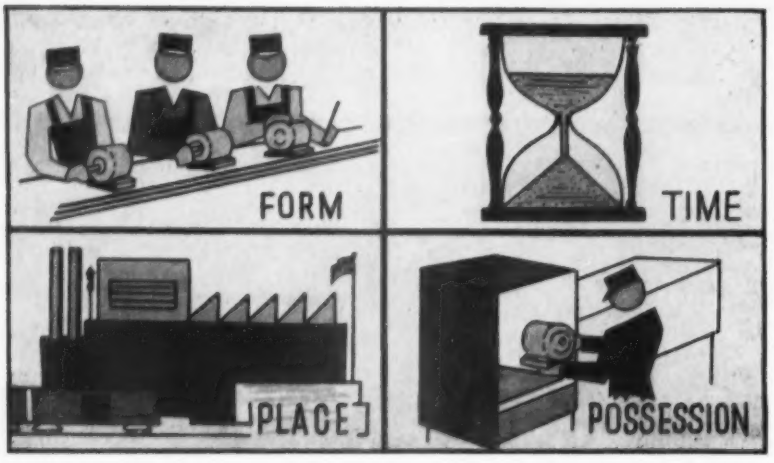
The function of a distributor of electrical products is to facilitate the movement of electrical products from the factories to the nation's utilities, industrial plants, contractors and construction projects and wherever else there is a need for electrical goods.

A special committee of the United States Chamber of Commerce defines distribution as "the final essential phase of production." They define production as "the creation of economic utilities including those of



The four elements of the production of value—land, labor, management and money

*Editor's note—Mr. Rehwaldt's address is available as a sound-slide presentation to NAED members as an employee education tool.



The four "utilities" of the production system—from raw materials to final customer use—form, time, place and possession—add value to the finished product

form, time, place and *possession*." To the form created by the manufacturer, the distributor adds the additional values of time, place and possession.

Unfortunately, today, too many people think that production is the key to the solution of all our problems, despite the fact that it is obvious that we can produce from now until the end of time; and unless we sell the output, the result is an unhealthy inventory and a sales-liquidation problem entailing frightful losses. This is not a visionary picture; it has happened often and it can happen again.

Let's consider first distribution's place in our national economy. We take raw materials, put them in usable form, and get them to the customer for his use when and where he wants them – and in the way he wants them.

There are four basic parts to this distribution cycle.

First is extraction. This is the activity which gets the raw materials from the earth or sea. It includes farming, mining, quarrying, fishing and possibly hunting.

Second is manufacturing or processing. In these activities, the raw material is put into usable form. Wheat is milled into flour, mixed into dough and baked into bread. Iron, copper, chromium, plastic, fibers and pigments are made into a refrigerator.

Third is distribution. The semi-finished or finished product is moved from the farm, mine or factory, sometimes over a long geographical distance, stored until the proper time, and finally sold to the customer—industrial user or ultimate individual consumer—where, when, and how he wants it.

Fourth is consumption. This is the actual use of the product. The consumer eats the bread, drives the car, uses the lawn mower and sits on the furniture.

Now, technically and actually, it is not quite this simple. For instance, there are distribution activities in getting raw materials from the farm or mine to the factory. Likewise, the manufacturer regularly performs certain distribution functions such as advertising, selling, packaging, and so on. Again, a distributor may do some things such as baking, assembling parts, which technically may be regarded as manufacturing or processing activities.

And the consumer also performs many functions. Do-it-yourself enthusiasts may do final assembling of their furniture. Everyone helps sell himself by reading advertising, picking goods by label off the supermarket shelves, and providing his own delivery service.

The "Value Added" Concept

The value added by distribution is a new concept. Philosophers and economists have debated for centuries which occupations are economically productive and which are unproductive. Modern economics has solved this problem by using the theory of economic values.

This theory was not always understood. In Greek and Roman times, agriculture was considered the only productive economic activity. Trade, exchanging of goods and services, as well as manufacturing, were thought to be unproductive.

Aristotle laid down the basic doctrine that money was unproductive and that one piece of money could not beget another piece of money. This theory, of course, missed entirely the real nature of money and the role of capital as a factor of production. Laws against charging for the use of money held sway until the Fourteenth Century, thus barring one of the most potent means of accumulating and using capital to increase and develop industry of all kinds.

Even as late as the middle of the Eighteenth Century, there arose a school of French economists, known as the Physiocrats, who believed and taught that only the extractive industries like agriculture, mining and fishing, where man labors with nature and brings forth a so-called surplus, can be productive – and that manufacturing and commerce were unproductive.

The theory of economic values began developing in the latter part of the Eighteenth Century, under the guidance of Adam Smith and the classical economics school. Under this theory, production is defined as the creation of economic values. Therefore, those activities which create value (or add value) are productive.

Today, most people think of "production" as being the same as "manufacturing." But, it isn't. Manufacturing is only one kind of production. Extraction and distribution also create, or add, economic value to goods and, therefore, are part of production, too. Those who think of only manufacutring as being production are unconsciously committing the same error as Aristotle or the Physiocrats in thinking that only one of the three vital processes – extraction, manufacturing, distribution – is productive and the others are not.

One more thing should be clearly understood in order to see just how distribution adds value. This is the idea of "the four factors of production." These four factors are the things that are necessary for production to take place: land, labor, management and capital. They are mentioned here for two reasons. First, they are necessary for production to take place. Second, the use of each of them has a cost which is reflected in the final price of the product.

To sum up this brief review of economics:

1. Extraction, manufacturing and distribution are all part of the production process. They are indispensable. They are productive.

2. All three activities add value to goods.

3. All three activities require the use of the four factors of production: land, labor, management and capital.

4. These factors of production are not free. Their cost is reflected in the price of goods.

Creating "Values"

Now let's consider how economic value is created. Value is created by the addition of "utilities." This is economists' language for four qualities that give a product the ability to satisfy human wants: (1) Form utility; (2) place utility; (3) time utility; (4) possession utility.

Form utility is created by extraction and manufacturing in taking raw materials from the earth and sea and shaping them into useful form. A potter at his potter's wheel creates form utility. A manufacturing plant mass-producing air conditioners or electric light bulbs adds form utility.

Place utility is having the product where the customer can use it. To light a house in Portland, the light bulb must be in Portland. It will do no good in Portland if it is still in the factory at Los Angeles. Getting the bulb from Los Angeles to Portland is the addition of place utility. Thus, value to the consumer is created by having the product in the same place as he is—by adding place utility to form utility.

Time utility is next. In addition to form and place utilities, the light bulb must be in Portland at a certain time. If it was there last week, or will be there next week, it is no good to the customer. To have value, it must be there now, when he wants it.

Possession utility is also added by distribution. The light bulb must be (1) in Portland, (2) when the customer wants it, and (3) in his possession before it has value to him. He must have the use of it, or possession utility, for him to be able to enjoy it. Specifically, the possession utility comes about through the functions of distribution called buying and selling. When the clerk in the drug or hardware store sells it to the customer, possession utility is added to the light bulb.

Now, the theory of value and utility is complete. For a thing to be of value to a consumer, it must be in usable form (form utility), where he wants it (place utility), when he wants it (time utility) and in his possession (possession utility).

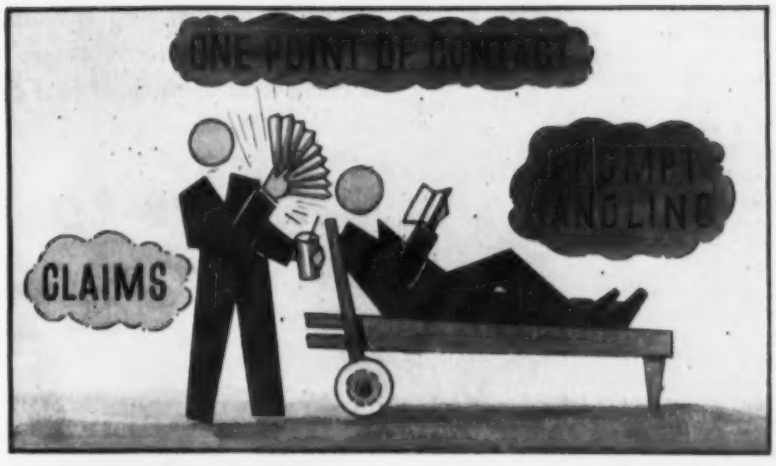
So this is how economic value is created—this is the complete process of production. Production is not just making a product (or creating form utility). Production is the creation of value by adding all four utilities to raw materials. And, three of the four utilities (time, place and possession) are added by distribution.

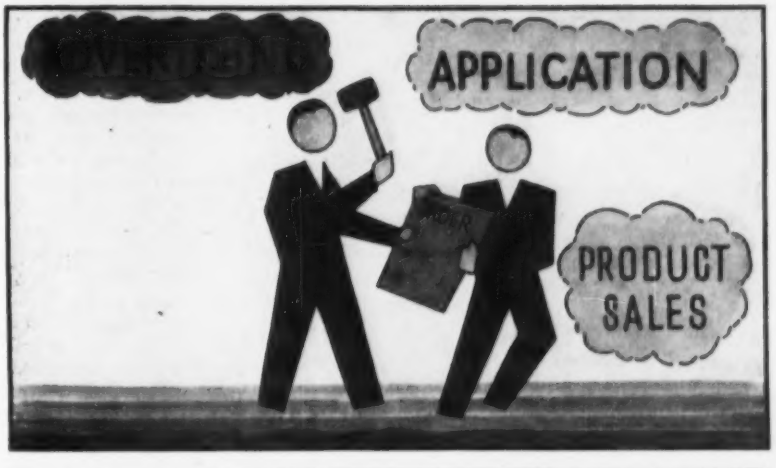
In adding the values of time, place and possession, distributors perform the following three main functions:

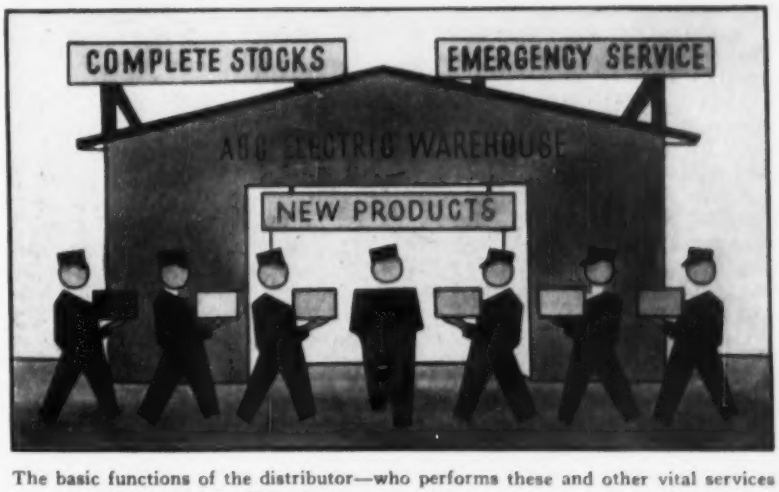
1. Making the product available to customer.

Locating potential customers for our products.

Providing warehousing, shipment and delivery.







The basic functions of the distributor—who performs these and other vital services more economically and efficiently than any other agency or system

Maintaining complete, well-rounded stocks for customer convenience. This also enables the customer to reduce his own investment.

Provide emergency service available 24 hours a day.

Locate "hard-to-find" items for customers. We have wide-source contacts.

Keep customers posted concerning new products and new product application.

Schedule shipments for large projects and expedite rush shipments.

Offer credit and financing facilities to help make products available to the customer.

2. Convincing the customer to buy.

By sales contacts and merchandising counseling.

By product showings.

By providing product application information, particularly new products.

By advertising and sales promotion activities, supplementing the manufacturers' national activities.

3. Keeping the customer satisfied.

By standing behind the products handled. This is particularly important to customers by reason of the many, many suppliers.

To most customers, the distributor is the one point of contact with their many manufacturing suppliers. The customer expects and receives prompt handling of all of the multitude of details involved in his purchases from a wide variety of manufacturing sources.

By making prompt settlement of justifiable claims made by our customers.

By being able to judge the fairness of customers' complaints.

By striving at all times to protect the industry's high reputation.

There are other functions that are entailed in accomplishing the above, such as: personnel training, accounting, statistical and clerical work, stock maintenance work and treasury activity.

Yes, the electrical distributor performs these essential and valuable services more economically than any other agency or system.

Considering all these functions, it is obvious that "distribution" is more than an "all we have to do is bill it" business.

After all, a distributor's worth is measured by the efficiency with which he performs the basic functions of providing time, place and possession utilities to the satisfaction of the industry's customers. It's an important job that merits tangible recognition and cooperation from every branch of the industry.

Recently declassified material shows how atomic fuel elements are fabricated; gives a close look at nuclear fuel cycles from . . .

Mines to Megawatts

J. E. O'Connell
Babcock & Wilcox Co.
Lynchburg, Va.

THE atomic fuel cycle includes: (1) uranium ore mining; (2) concentration by milling operations; (3) refinement of the concentrates; (4) either conversion to natural uranium metal or enrichment at gaseous diffusion plants and conversion to UF_6; (5) fabrication of fuel elements for heterogeneous reactors; (6) fission (and, in converters, transmutation of fertile to fissile material) in reactors to produce useful heat for steam generation; and (7) chemical reprocessing of spent fuels and the refabrication of these materials and supplementary fresh feed materials into new fuel elements.

In discussing the steps from the mine to the megawatt, an effort has been made to correlate the writings of many others without attempting originality. The primary effort is to point out the economic factors that will influence the fuel cycle complex for power reactor systems.

Uranium Mining

United States "measured, indicated and inferred" uranium ore reserves have recently been announced as more than 60,000,000 tons with an average uranium oxide content of 0.25%. Until two or three years ago domestic uranium came from numerous small mines in Utah and on the Colorado plateau. Today, however, the total uranium mining and milling operations are considerable. During 1956, annual production grew from 4,000 tons to 8,000 tons of uranium oxide.

Uranium ores are costly because most ore bodies are relatively small and situated in extremely rugged terrain, remote from operating supplies, labor, water and power. Crude ore, as it leaves the mine is valued at from $1.50 to $3.50 per lb, depending on its grade.

Uranium Milling Operations

The size of the domestic milling industry is best indicated by the AEC's announcement that as of September 1956 the 12 uranium mills operating in the United States have a capacity of 8,960 tons of ore per day. Private investment in 11 of these mills is about $50,000,000. During 1956, contracts were let for eight new mills with a combined output of 4,000 tons per day and a private investment of about $35,000,000.

The percentage of uranium oxide in the ore as mined is normally so low that it must be beneficiated (improved) and concentrated by more or less conventional milling processes. The AEC has established raw material purchasing centers near the mills to receive the ore from the mines. The ore is weighed and crushed, ground to 28 mesh, leached with sulphuric acid, and desanded. The uranium is then chemically recovered, dried and packed for shipment. Output of the mill, termed "yellow cake," is a concentrate of 60% to 70% U_3O_8 valued at about $8 per lb.

Processing Yellow Cake

The AEC's production center at Fernald, Ohio, is reported to have cost $92,000,000, which gives some idea of the magnitude of this operation. A similar center is being erected near St. Louis. At the production centers, the yellow cake from both domestic and foreign sources is dissolved in nitric acid, then undergoes solvent extraction, denitration, and hydrogenation to produce UF_4 to "green salt." The green salt is taken through one of two processes; (a) reduction to metallic uranium; or (b) conversion to uranium hexafluoride for enrichment at one of the AEC's gaseous diffusion plants.

Uranium Enrichment

While 14 isotopes of uranium have been identified, having mass numbers ranging from U^{227} to U^{240}, the only isotopes that occur in abundance in natural uranium are U^{235}

and U^{238}. About 0.7 of 1% of natural uranium is fissionable U^{235} with the remaining 99.3% being U^{238}. U^{238}, while not fissionable with thermal neutrons, absorbs them voraciously and thereby prevents their causing the fission of U^{235}. It is therefore necessary to concentrate the proportion of U^{235} for most uses.

Isotopes, being chemically identical, must be separated by processes exploiting their slight difference in mass. For large scale continuous operation, the gaseous diffusion process is most attractive. There are gaseous diffusion separation plants at Oak Ridge, Tenn.; Paducah, Ky.; and Portsmouth, Ohio; representing a total AEC investment of $2.3 billion.

The buildings at Oak Ridge cover nearly four acres and require 16 billion kwh per year – three times the power requirements of the city of Detroit.

Within the separation cascade (see diagram) uranium hexafluoride gas containing both isotopes is supplied under slight pressure to one side of a porous membrane. The membrane contains billions of holes, each less than two-millionths of an inch in diameter. Naturally, the velocity of the light molecules (containing U^{235}) is slightly greater than that of the heavier molecules (containing U^{238}). The faster molecules strike and penetrate the barrier more frequently and in this manner the concentration of U^{235} on the lower pressure side of the membrane is increased. By arranging such units in series for thousands of stages, it is possible to enrich the U^{235} isotope in the mixture to nearly 95%. The AEC then turns the enriched UF_6 over to the private chemical industry for conversion into forms (such as UO_2) usable for fuel element fabrication.

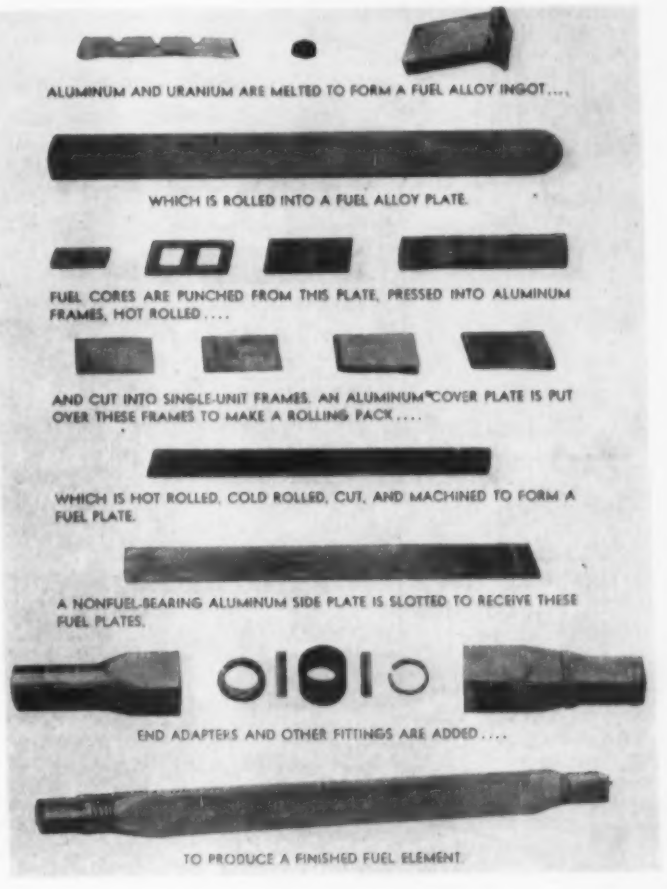
Uranium Metal

Uranium metal looks like nickel and has a specific gravity of 18.6; i.e., a density of 1,230 lb per cu ft. Fine chips and powders are highly pyrophoric and, owing to its economic and stragetic power, very strict accountability is necessary.

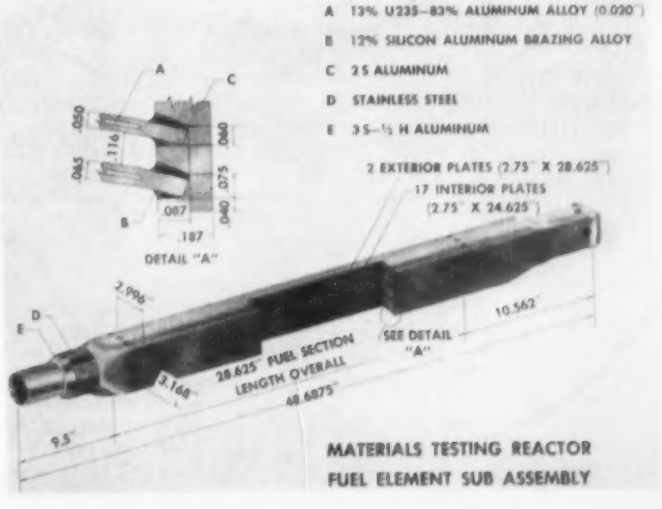
While ingestion of uranium dust (during grinding, for example) constitutes a health hazard, unirradiated uranium metal is not particularly dangerous and can be freely handled. Its corrosion rate in water, steam and air is high and increases with temperature. As a result, when uranium metal is used in a reactor,

A Selected RMEL Paper

Nuclear Fuels Cost Big Money . . . Here's Why


ALUMINUM AND URANIUM ARE MELTED TO FORM A FUEL ALLOY INGOT....
WHICH IS ROLLED INTO A FUEL ALLOY PLATE.
FUEL CORES ARE PUNCHED FROM THIS PLATE, PRESSED INTO ALUMINUM FRAMES, HOT ROLLED....
AND CUT INTO SINGLE-UNIT FRAMES. AN ALUMINUM COVER PLATE IS PUT OVER THESE FRAMES TO MAKE A ROLLING PACK....
WHICH IS HOT ROLLED, COLD ROLLED, CUT, AND MACHINED TO FORM A FUEL PLATE.
A NONFUEL-BEARING ALUMINUM SIDE PLATE IS SLOTTED TO RECEIVE THESE FUEL PLATES.
END ADAPTERS AND OTHER FITTINGS ARE ADDED....
TO PRODUCE A FINISHED FUEL ELEMENT.

A "Low Cost" Fuel Element for the MTR



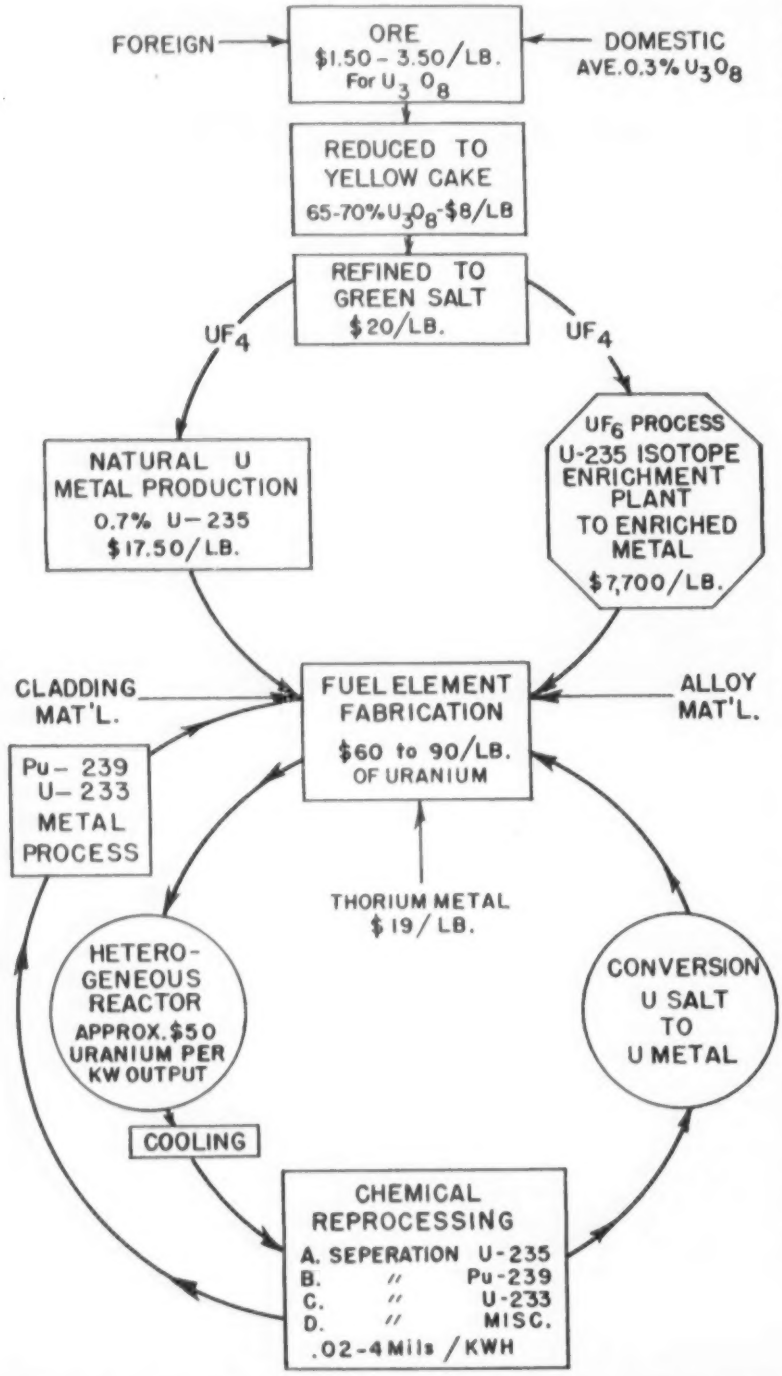
it must be clad in a protective, corrosion-resistant jacket.

The metal is extremely sensitive to temperature; both its physical and mechanical properties being affected. It is also anisotropic, having markedly different physical properties in the three directions, which results in considerable dimensional instability. For example, a polycrystalline rod of wrought uranium tends to have preferentially oriented grains and may expand to about six times its length in an autoclave that is rapidly heated and cooled repeatedly between 120 F and 1,100 F.

Irradiation, too, will cause a crystal of uranium to elongate in one direction, decrease in another, and remain unchanged in the third. The accompanying figure illustrates this, as well as the beneficial effects of alloying the uranium.

For the reactor industry, of course, the major problem resulting from dimensional instability is that coolant channels could be closed off, resulting in an interruption of the coolant flow and the meltdown of a portion of the core, with its attendant consequences.

To meet this problem, techniques and alloys have been developed to randomize grain orientation and minimize dimensional changes. Unfortunately, the alloying process increases fabrication costs, and adds significantly to the chemical reprocessing costs because the alloying material must be dissolved along with the fuel. Moreover, the greater the value of a metal as a corrosion-resistant alloy, the more difficult and expensive its chemical reprocessing becomes.



The nuclear fuel cycle . . . with a ball-park look at the economics involved

Making Fuel Elements

Owing to the adverse characteristics just mentioned, the fissionable material in the fuel elements of all heterogeneous, liquid-cooled reactors must be clad with protective coatings—usually of aluminum, zirconium or stainless steel. This cladding, while only about 15 mils in thickness, prevents: (1) corrosion of the fissionable or fertile material by the coolant, and resultant contamination of the reactor coolant system; (2) metal distortion due to irradiation instability; and (3) escape of radioactive fission gases and solids.

The mechanical procedures involved in fabricating a fuel element for the Materials Testing Reactor are dealt with here since it represents our industry's nearest approach to a standard element. Very similar elements are also being used in swimming pool research reactors, in the Engineering Test Reactor and in others. The operations illustrated in the accompanying photographs demonstrate what is involved in the production of an economical element for low temperatures.

Because of the higher temperatures encountered, fuel elements for power reactors are usually alloyed (and clad) with zirconium or stainless steel. The selection of materials for use in power reactor elements is a compromise between strength, ease of fabrication, corrosion resistance, maximum surface temperature, neutron absorption cross section, thermal conductivity, effects of radiation and cost.

Fuel elements of zirconium-uranium alloys require special fabrication techniques since zirconium is a highly reactive metal under certain conditions and is extremely sensitive to very small amounts of contaminates. The production procedures required to avoid such contamination include: vacuum arc melting to produce the alloy, vapor blasting and acid pickling between various operations, vacuum rolling to form the plate, vacuum or inert-gas welding to form an assembly from individual plates and, finally, vacuum annealing and stress relieving.

The high cost of zirconium and the cost of such fabrication techniques must be carefully balanced against the nuclear and other advantages. The fabricating cost of such an element might be 50 to 100 times greater than the cost of fabricating a similar (low-temperature) element of aluminum alloy.

Breeder Reactors

If, in addition to the basic fissionable fuel, a large quantity of fertile U^{238} or Th^{232} (thorium) is loaded into a reactor, some of it can be transmutted to the fissionable isotope of Pu^{239} (plutonium) and U^{233}. These reactors are called converters. The conversion ratio of such a reactor is equal to the grams of new fissionable material formed, divided by the grams of original material consumed. A breeder reactor is a converter that produces more fissionable atoms (fuel) than it consumes.

Thermal (slow neutron) reactors using Pu^{239} can be designed with conversion ratios up to 0.9; but a fast-neutron reactor is required before breeding can be achieved with Pu^{239} fuel. In a thorium converter burning U^{233} fuel, the conversion ratio may be greater than 1, although an operating breeder has not been demonstrated at this writing.

Nuclear Fuel Cycles

In viewing the economics of fuel cycles, it soon becomes obvious that the significant long range cost item is the basic fissionable material requirement. In general, the cost of the fertile (convertible) material for reactor use will not be a controlling factor whether it be the isotope of U^{238} in natural uranium or thorium (Th^{232}).

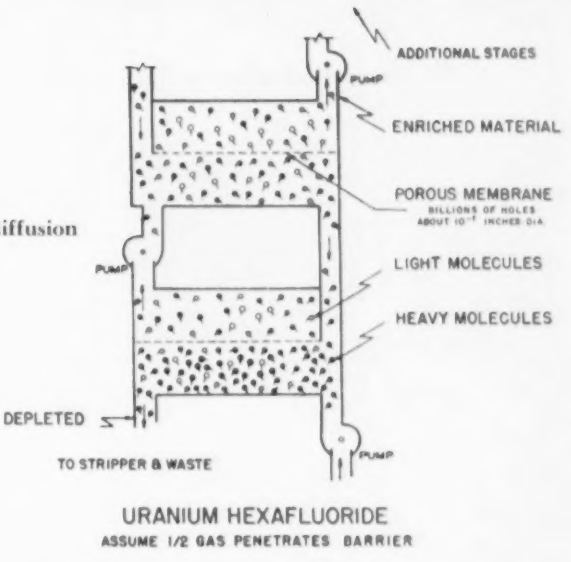
Economic studies of these costs, using various enrichments of uranium, give a valuable indication of power costs for the present experimental period and the first and second generations of nuclear power plants that will follow. If nuclear fuels are to be economically competitive with conventional fuels in this country, high-ratio conversion or true breeding of nuclear fuel is imperative. It is difficult to visualize a long range power program based solely on the use of enrichment uranium.

There appear to be two possible systems of obtaining a competitive nuclear fuel economy. These are: the U^{238}-plutonium cycle and the thorium-U^{233} cycle, both of which should eventually culminate in breeder reactors.

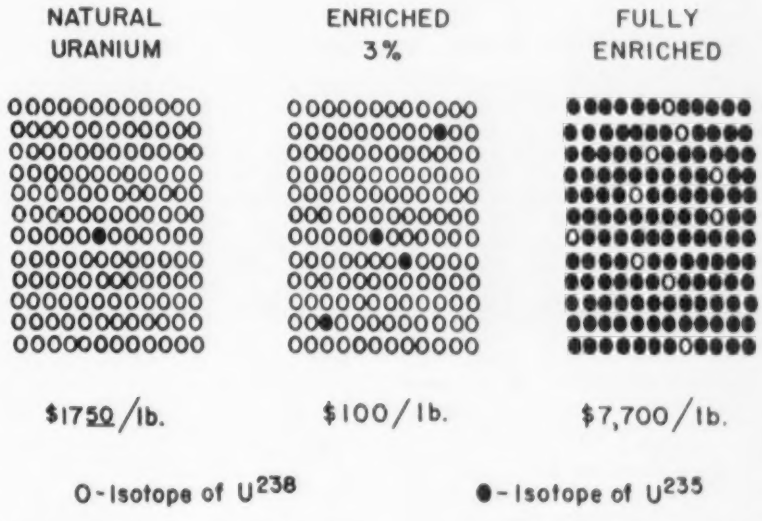
The thorium-U^{233} cycle is of great interest both in this country and in the foreign market because of the world's large supply of available thorium. On the basis of neutron economy, the thorium-U^{233} cycle is better for thermal reactors than the uranium-plutonium cycle. Fuel elements containing thorium present a potential for better utilization of the fissionable U^{233} in internal converter reactors. Achievement of breeding in a heterogeneous thermal reactor using U^{233} fuel, however, may require the use of heavy water as the moderator.

Regardless of the fuel cycle used, when the available burn-up has been achieved for both the fissionable fuel and the transmutted fertile material, operation of the reactor must be interrupted, the reactor vessel opened, and the fuel elements removed. The elements will be stored in a separate area adjacent to the reactor while most of the isotopes

How the gaseous diffusion process works . . .



. . . and how much its end products cost



Effect of Radiation on a Sample Fuel Piece

Before insertion in reactor

After a certain exposure in the reactor

After twice as much exposure

with short half-lives decay. This decay process will require several months before it is economically feasible to ship the irradiated elements in lead caskets for chemical processing.

Chemical Reprocessing

The purpose of chemical reprocessing is to recover the fissionable isotopes of uranium and plutonium and to remove the highly radioactive fission products. The fissionable isotopes recovered included the original unfissioned fuel and the newly formed fissionable isotopes that have been transmutted from fertile material.

The nuclear industry faces a difficult pair of alternatives in the realm of reprocessing and refabrication. To avoid the great cost of remote refabrication of fuel elements, it is necessary to achieve—at great reprocessing cost—a high degree of separation between the reusable fuel and the radioactive fission products. Somewhere between these extremes, the industry must effect the most economic compromise. Separation processes must be capable of high yields, and decontamination factors in the order to 10^7 to 10^8. Hold-up time must be kept to an absolute minimum to control the inventory charges on these special materials.

In addition to the problems of health hazards, strict accountability and the effects of radioactivity on process chemistry, great care in plant design must be exercised to preclude the formation of a critical mass at any location. The geometry and size of components must be such as to make such an accumulation impossible, regardless of equipment failure and inevitable human errors.

In a chemical reprocessing plant handling highly radioactive materials, enormous concrete shields are required as are mechanisms for complete remote control and maintenance.

In the reactor power industry, all types of complex fuel elements are being fabricated or planned with no emphasis on standardization. Therefore, it will be difficult to build an economically attractive chemical reprocessing plant. Present AEC separation plants have limited throughputs and are not designed to cope with the variety or quantity of fuel elements anticipated in the future.

These totally government-owned reprocessing plants must someday be supplemented by privately owned facilities. Based upon the present anticipated rate for installing both military and industrial nuclear steam generators, facilities to process approximately 1 to 3 tons of irradiated fuel per day will be needed in the next decade.

Estimates of the cost of reprocessing range from more than 4 mils/kwh to less than 0.02 mils/kwh. This discrepancy is not only a matter of bookkeeping but is also indicative of the inability to extrapolate accurately from small pilot-plant operations with low through-puts to large, efficient commercial plants.

In order to indicate the magnitude of the problems involved in fuel reprocessing operations, we can consider the simple fuel slugs irradiated in a plutonium production reactor. The aluminum-jacketed fuel slug would contain a mixture of U^{238}, U^{235}, Pu^{239}, small quantity of other isotopes of both uranium and plutonium, and fission products consisting of possibly 200 isotopes of 34 different elements! Moreover, from a commercial reactor's fuel elements, we would have to cope with additional isotopes of thorium, zirconium, stainless steel.

Regardless of what chemical process or combination of processes proves to be most economical, one of the greatest problems facing a self-sustaining nuclear industry is waste disposal. The present temporary methods and techniques appear to be adequate only for the moment. When nuclear steam generators become economically competitive with conventional, fossil-fired boilers, the daily quantities of radioactive materials to be disposed of will increase from our present ounces to tons. We anticipate that some of these wastes may become useful, salable by-products. Industry and the national laboratories have done an outstanding job of analyzing these problems, and the untold number of scientific and engineering man-hours expended show definite promise of finding solutions.

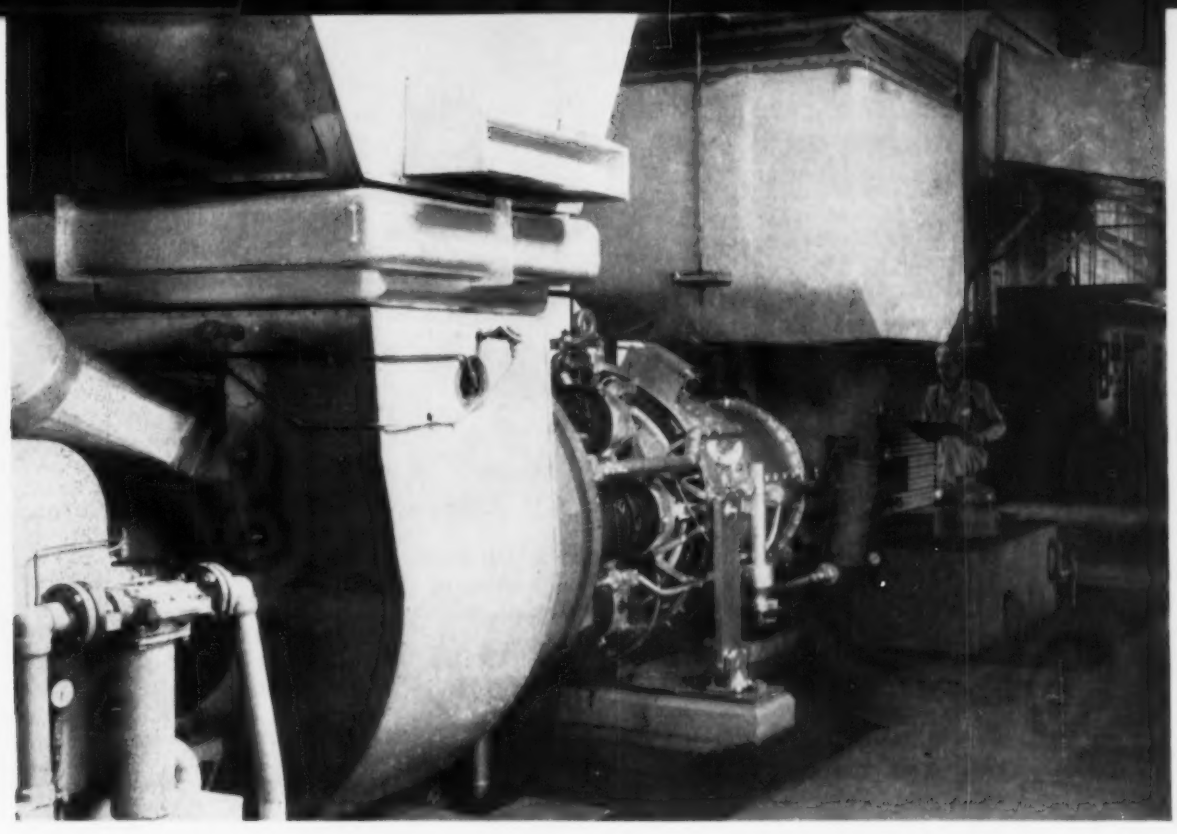
Looking Forward

It appears that the greatest hope for economically competitive nuclear power lies in making the cost of nuclear fuels lower than the cost of fossil fuels. Our present technology of fuel cycles indicates that this will require development of a breeder or a high-ratio converter reactor.

Optimization of breeder and converter reactors will be a necessary step forward, but the heart of the economics for heterogeneous reactors today consists of reducing (1) the cost of fuel element fabrication; and (2) the cost of chemical reprocessing to recover the fissionable unburned fuel and converted fertile material.

If we could utilize fluid-fuel reactors, the cost of fuel element fabrication would be essentially eliminated since only the cost of preparing the homogeneous fuel would be necessary. It appears, however, that further work on the technology and economics of homogeneous reactors is necessary before their advantages can be exploited. An absolutely leak-tight, and even more important, maintainable system to contain the billions of curies of radioactivity circulating in the primary system fuel solution must be developed and demonstrated to be practical.

To reduce the over-all fuel cycle cost, the nuclear physicists, engineers, metallurgists and chemists must integrate their efforts in order to obtain an economic compromise between the factors governing fuel element manufacture and those facilitating chemical reprocessing and waste disposal. The economic incentive exists; there is no reason why a sound, self-sustaining nuclear fuel economy cannot be achieved.



Oklahoma Gas & Electric's pioneer gas turbine installation. Rated 3,500 kw, this unit has operated 38,000 hours

A close look at the economics proves

Gas Turbines Come of Age

P. H. Light

Manager, Electric Utility Engineering Unit
Apparatus Sales Division, General Electric Co.
Schenectady, N. Y.

The idea of a gas turbine is not new. For centuries people have been intrigued with the idea of such a machine. A book called "Mathematicall Magick" written by Bishop Wilkens in 1648 presented detailed sketches and a discussion of a simple gas turbine arrangement. However, in spite of these early ideas the lack of materials and "know-how" delayed development of an economic central-station-type combustion gas turbine until about 10 years ago.

Central Station Debut

In 1949 the first combustion gas turbine-generator installed in the United States was combined with a steam plant. Heat in the gas turbine was utilized to heat feed water for an existing turbine plant. This gas turbine-generator, rated 3,500 kw, was installed in the Belle Isle plant of Oklahoma Gas & Electric Co. Since that time it has operated about 38,000 hours.

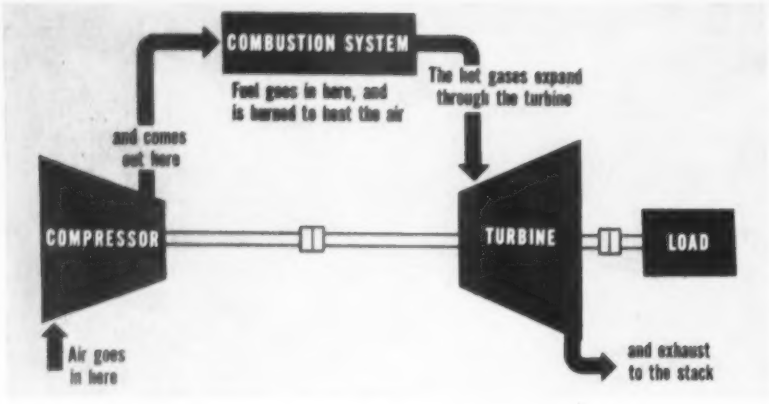
Since this machine was installed in 1949, gas turbines have been supplied for power generation, gas and oil pipe line pumping service, petrochemical and rubber plants, refineries, oil field repressurization, railroad locomotive service and propulsion power for shipping. Numerous installations have been made in industrial plants where the gas turbine supplies both electrical power and steam for process lines.

A Selected NELPA Paper

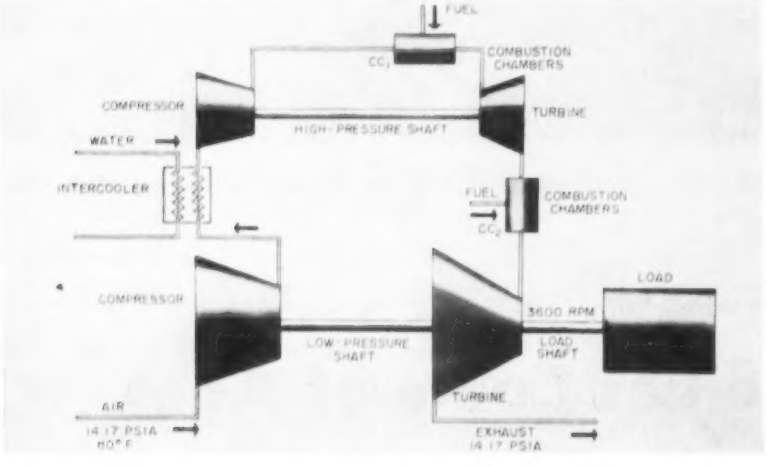
Northwest a Natural

In the Northwest there is an abundance of hydro power. However, as with most hydro systems, the energy available is limited by the amount of water available any particular year. In most years, there is enough energy available to meet the needs. However, during low-water years the power supply must be firmed up or a shortage of power results. Electric loads being what they are, there is also the possibility that demand on peak can exceed installed capacity even though there is plenty of water. Thus some form of reserve supply is needed to meet these two requirements, that of *firming up hydrogeneration during low-water years and also supplying peaking capacity.*

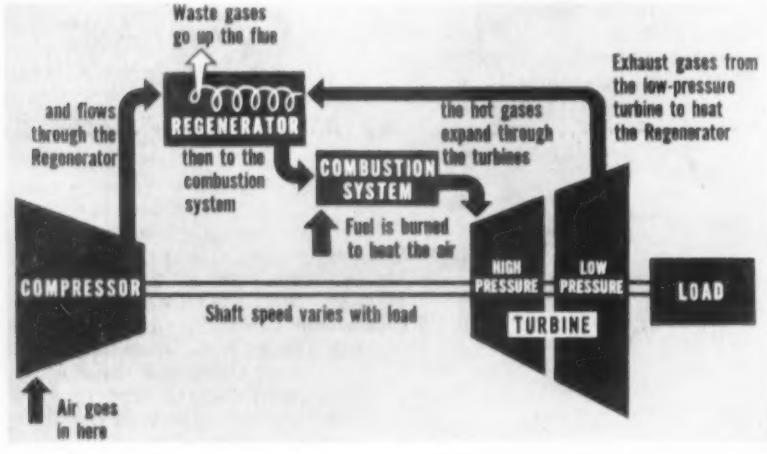
This supply should have: (1) low


COMBUSTION SYSTEM
Fuel goes in here, and is burned to heat the air
The hot gases expand through the turbine
and comes out here
COMPRESSOR
TURBINE
LOAD
Air goes in here
and exhaust to the stack

Flow diagram of the simple cycle-one shaft gas turbine. Units of this design, rated 21,800 kw, are being manufactured. Least efficient of several cycles, users can expect 22.8% (LHV) to 20.6% (HHV) efficiency on gas from these machines



The flow diagram of the intercooled reheat machine. Efficiencies are 26.4 (LHV) or 23.8 (HHV). Ratings are currently available in the range of 27,500 kw



The flow diagram of the regenerative cycle-single shaft design. These units offer 29.2% (LHV) or 26.3% (HHV) efficiency and ratings of the order of 15,200 kw

installed cost; (2) availability on short notice; (3) low maintenance costs; (4) require a minimum of attention and operating personnel during the shutdown period.

The gas turbine-generator fulfills all of these requirements and appears particularly attractive for this service.

The fact that natural gas has become available in the Northwest also raises the question as to the possibility of using the gas turbine to load factor the gas pipe lines.

In considering the possibilities of the application of the gas turbine for peaking power on hydro systems, the following factors should be considered: (1) various cycles and their characteristics; (2) size of units; (3) reliability; (4) fuels; (5) costs.

Cycles

Today's more common gas turbine cycles and their characteristics are shown in accompanying flow diagrams. A fourth cycle, not illustrated, deserves mention—the regenerative intercooled reheat with two shafts.

The flow diagram of this cycle is the same cycle as for the intercooled reheat cycle except a regenerator is added between the high-pressure compressor and the first stage combustion system, resulting in a unit rated 26,000 kw. Efficiency of this unit is about 31.5% (LHV), or 28.4% (HHV) on natural gas, which compares favorably with steam plants of the same size.

Bonus Ratings

The ratings of all the units mentioned are at NEMA standard conditions of 80 F ambient and 1,000-ft altitude. All units are capable of increased capacity at lower ambients. For example, the capability of simple-cycle units at O F ambient temperature is 45% over rating at standard conditions. This increased output should be particularly important for units located in an area where the need for increased system capacity or energy occurs during the winter months when ambient is low.

All these units are coupled to hydrogen-cooled generators. Maximum advantage can be taken by using standard sizes and allowing for additional turbine output resulting from low ambients.

In some cases special couplings are provided, allowing the generator to be uncoupled from the turbine so the generator can be operated as a synchronous condenser to help hold system voltage.

Reliability

In designing and building gas turbines for power generation, it was realized that reliability should be comparable with steam turbine plants. Therefore, great care is taken to assure the design, materials and workmanship are such that good reliability will be obtained. Operating experience of more than 1,800,000 hours of operation have been accumulated by the 115 units already in service.

Fuels

Three types of fuel are presently used, including natural gas, distillate oil and specification residual oil. Natural gas is, of course, the cleanest fuel available and, where its cost and continuity of supply are favorable, it makes an ideal fuel for a gas turbine plant. Distillate fuels are in almost the same class but their cost may rule them out, except for emergency use in a plant that normally burns gas or in peak load service. Bunker C or residual oils almost always contain some impurities such as sodium, vanadium and others. Sodium and vanadium are the corrosive agents and it is generally necessary to treat the residual oil before it is used in the gas turbine. Treatment consists of washing to remove most of the sodium and the addition of magnesium sulfate (Epsom salts) to counteract the corrosive properties of vanadium. The treating plant is usually located at the gas turbine plant location and in general adds about 1/3c per gal to the cost of the oil.

Another possibility is the use of dual fuels. Control is available to provide for operation on any one or all three of these fuels. Thus gas can be used when it is available with provision to transfer manually or automatically over to distillate when necessary or advantageous. Transfer from gas to residual oil is also possible but requires a unit shutdown to change fuel nozzles.

Plant Costs

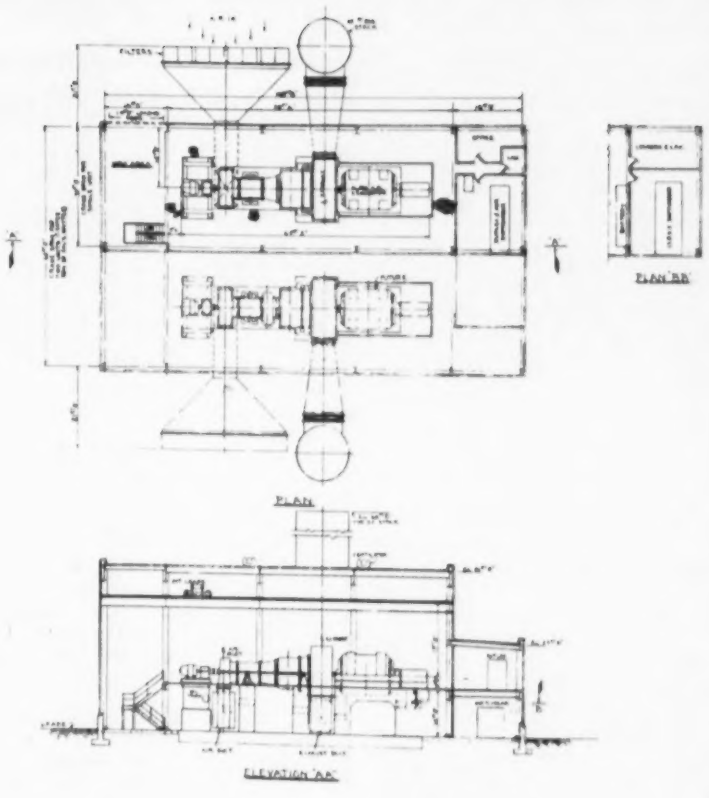
A discussion of the use of the gas turbines would not be complete without some mention of plant cost. Just as steam plant costs cover a wide range depending on the area, labor cost, spare capacity, etc., it is equally difficult to arrive at an installed cost of a gas turbine plant.

However, studies indicate a two-unit plant with two simple cycle one shaft units would have an installed cost of about $132/kw. The building structure can be extremely simple and very few auxiliaries are required. It is estimated such a plant could be completely installed in about two years after the turbine-generator is placed on order.

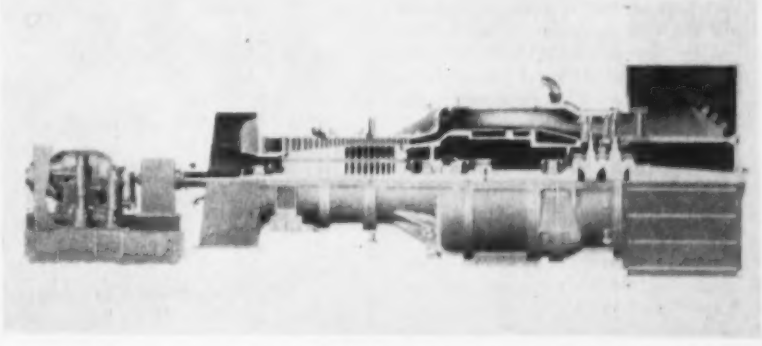
Another important point is that these costs are based on the 80 F ambient rating. By taking advantage of the increased output resulting from low ambient, which will actually exist during the winter months or at the time of system peak and at the time when water shortages may exist, the installed cost per kw output becomes very attractive. For example, with a 40 F ambient and based on an output basis, the cost would be reduced to approximately $107/kw. At O F ambient, this approaches $90/kw.

These figures are very much lower than published costs on steam stations of equivalent-size units and compare favorably with plants in the larger-size range.

It is estimated the intercooled



Plan view of two-unit station using units of the simple cycle-one shaft design



Cross section of a simple cycle-single shaft turbine. Rating is 16,500 kw

reheat unit could be installed for slightly more than the simple cycle one shaft unit; the regenerative intercooled reheat unit for about $157 /kw and the regenerative cycle one shaft unit for about $171/kw.

Maximum sizes presently available have been indicated for each cycle. Actually, large size is not a benefit because it is large but because it may have a lower cost per kw. Also, large size in a steam plant usually results in lower operating cost per kw. Inasmuch as the gas turbine plant may be remote operated, this fact loses its significance.

In an area where the power supply is predominantly hydroelectric, it would be expected the greatest use of gas turbines would be for peaking purposes, resulting in very low load factors. During years when there is plenty of water the units might be used largely for stand-by power, or to obtain peaking capability at the time of the annual peak load. During low-water years the units could be used to supply energy as well as peaking power. Also, by operating the gas turbines during the hours of the day or night when the gas load is light and storing water to be released to handle the electric load over the daily load peak, the gas turbine could be used to improve the load factor on the gas supply system. This would be more practical for a gas turbine plant than a steam plant because of its quick starting time.

Operating Costs

When used in this manner, the gas turbine has several advantages as far as operating costs are concerned. The labor requirements are low, inasmuch as the gas turbine unit may be remotely operated if desired, thus requiring no station operating personnel. Such peak load machines would require little maintenance. The ability of the gas turbine to be started up quickly, be put on the line in 15 to 30 minutes and to be shut down rapidly helps to eliminate the stand-by losses inherent in the use of steam units for such service. Also in favor of gas turbine plants is the small cooling water requirement.

To summarize, the gas turbine generating plant has low investment cost, good reliability, low operating and maintenance cost, and the ability to be quickly brought up to speed and loaded. These characteristics indicate the gas turbine plant should be considered favorable as a source of power for peaking as well as stand-by service on hydroelectric systems.

IBM 650 Computer Estimates 122,558,802,000 Kwh for 1957

Not having a reliable crystal ball about the office, the editors have enlisted the services of an IBM 650 computer in an attempt to forecast which contest entrants seem closest to the projected 1957 annual kilowatt-hour consumption.

Working with Federal Power Commission figures for the past 10 years, Mike Anderson of IBM's Los Angeles test center and C. J. Stone, a mathematics major at Cal Tech, developed three different mathematical approaches or "programs" to pick the 20 contest entrants whose guesses seem at this time to be the closest to the 1957 kwh total. After carefully comparing all three programs, it was decided that the "least squares" method of prediction would be the most interesting to try out on a 650 computer. To do this, the IBM computer was programmed to take the figures furnished by ELECTRICAL WEST from the Federal Power Commission for the past decade, then to use the least-squares technique on each month, then fusing the results to forecast the corresponding consumption pattern for 1957.

The significance of this electronic prognostication, ELECTRICAL WEST believes, is not so much the actual prediction as it is to demonstrate the relative time savings of doing a similar estimating job on digital computers. For example, Mike Anderson estimates that if he took full advantage of the computing power of the 650, he could swallow the 10 years statistics and make the projection in 15 seconds.

Because digital computers are only tools—and not seers—the results naturally are dependent on the validity of the mathematical program used to analyze past consumption figures and to extend them through 1957. Readers of a mathematical or statistical bent are invited to make suggestions for use on further predictions.

The Top 20 Contenders

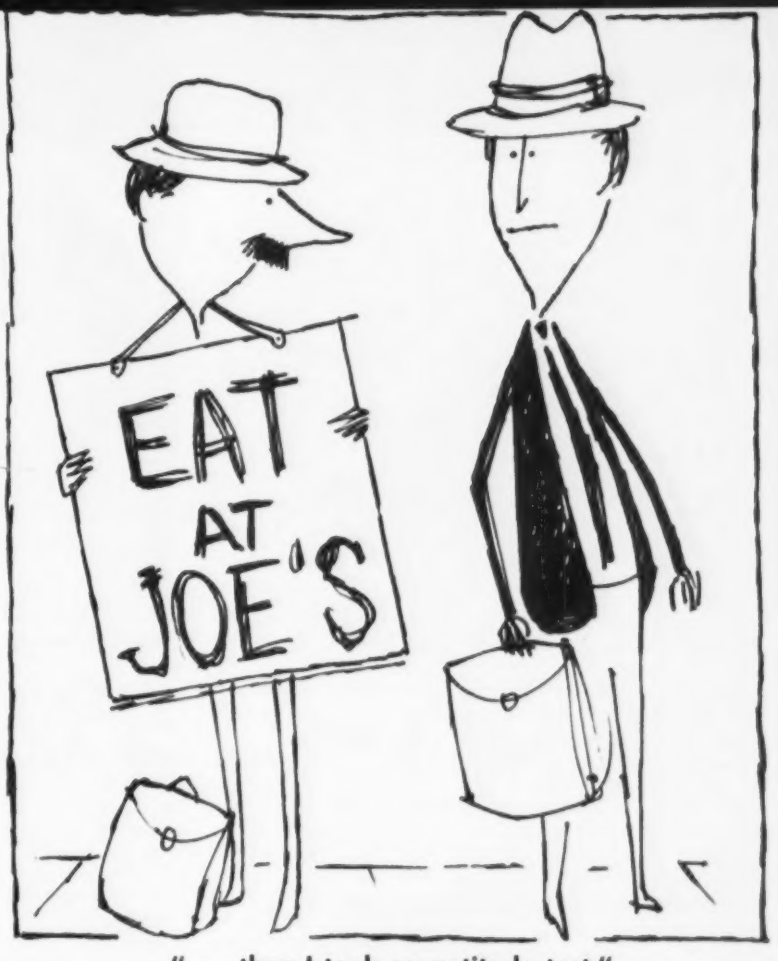
An interesting facet of the top 20 guesses to date, according to the computer's figuring, is that eight of the thousand entrants submitted the same guess exactly—122,581,872,720 kwh. All of the 20 nearest guesses were *below* the computers' figure. Where are the industry's optimists?

J. Schuster	Pacific Gas and Electric
R. M. Gilbert	Vender
P. W. Kiesling	Colorado Public Service
H. W. Prentice	California Oregon Power
R. A. Benson	City of Seattle
R. Couch	U. S. Government
H. W. Schmidt	Pacific Gas and Electric
W. N. Bell	California Electric Power
L. W. Kettle	Colorado
H. D. Dougherty	California Electric Power
J. Ferreira	Hawaii
C. E. Wigton	Pacific Gas and Electric
J. A. Hoyt	Southern California Edison
A. B. King	Vender
D. Harmer	Southern Nevada Power
O. R. Lirsch	Consultant
K. R. Edwards	New Mexico Public Service
F. H. Wiley	Municipal
R. Pedersen	Southern Nevada Power
W. Van Gordon	Pacific Gas and Electric

Next month we will come up with a new "hot number" and ask the machine to tell us, by occupation, whose guesses are best.

Which engineering jobs pay best? Which branch pays best? Is there a shortage of engineers? Let's talk . . .

About Engineers



". . . then I took an aptitude test."

Of recent months there have been two excellent reports concerning engineers' incomes—one published by the Engineers Joint Council and the other by the National Society of Professional Engineers. Each of these groups also has enriched the industry with newsletters regarding the supply and demand of technical and scientific people. Items concerning the professional status of engineers are also included.

Taken out of context, these reports will support nearly any conclusion. As a result, popular articles debunking the shortage of engineers, the opportunities for engineers, the income of engineers have appeared. Our purpose in excerpting from these works is to whet appetites—not to draw conclusions. Surely these works are *musts* for engineers in supervision, and of great interest to engineers in general.

Can We Be Objective?

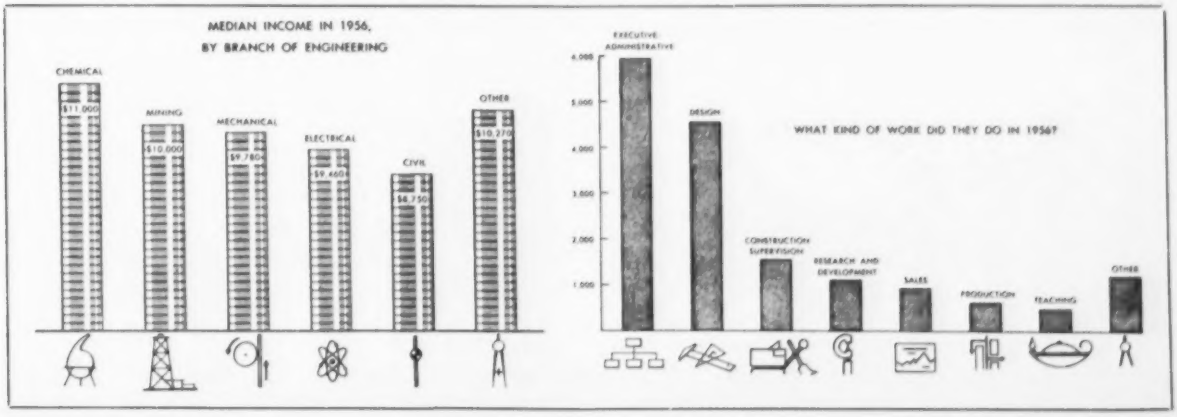
Since these works bear heavily on personal incomes it is difficult to use the usual engineering objectivity. For instance, indication that one branch of engineering is more remunerative than another is not necessarily justification for "lining them up." These are facts — and surely should be used as the basis for sound action by all. Abused, these facts will no longer be available. This is a challenge to engineers as professionals.

NSPE's report dated 1956 covers 17,045 NSPE members in 48 states.

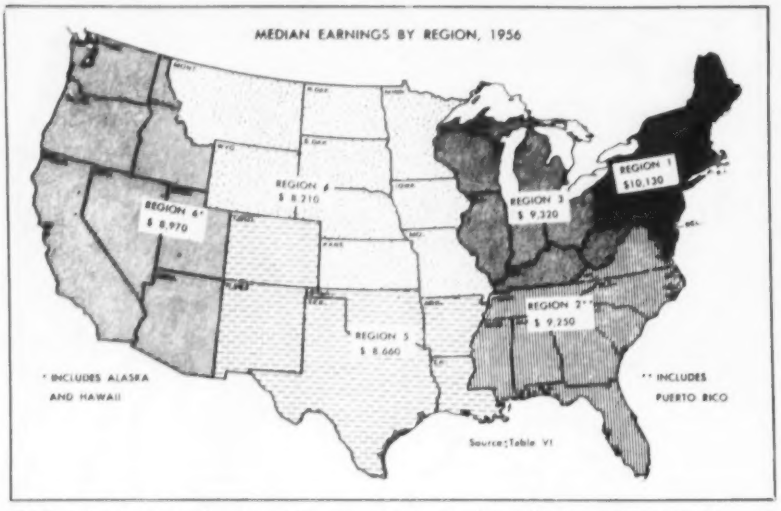
The EJC report was made by surveying engineers in industry and government and education. This report draws on the founders societies as a source of engineers. For this reason the two reports are not directly comparable.

Increasing Productivity

Engineering Management Reports, P. O. Box 166, Cambridge, Mass., has published a report pointed toward increasing engineering productivity through organization, planning, leadership and—



The charts reproduced on these pages are taken from the 1956 salary survey of the National Society of Professional Engineers



Regional salary levels show Eastern salaries to be well above Western incomes

proper compensation. This work is strongly recommended since it puts compensation in its true prospective to factors more controllable than the supply and demand for engineers. The conclusions and suggestions form a worth while check list whereby engineering management can analyze its effectiveness and chart a course to more productive use of engineers.

Shortage?

The crux of the shortage question may lie in the fact that approximately 50% of the nation's engineers are directly or indirectly employed in defense efforts. For this reason any rapid changes in the defense effort will be reflected in the supply of engineers. Long term, there is every indication that demand will increase as a result of the increasing technical complexity of all goods and services. On the supply side recent EMJ figures would indicate a supply of 44,000 engineers in 1960 if present attrition rates hold for 1956 freshman. This compares favorably with 26,000 BS graduates in 1956.

The National Bureau of Economic Research which enjoys the awesome reputation of a college of cardinals in the field of economics has just published a book which asserts "there is no evidence of a shortage of engineers." The authors adopt the erudite economic viewpoint that this conclusion "rests upon the fundamental economic principle that increases in demand relative to supply will manifest themselves in a free market, a rising price relative to prices in other markets."

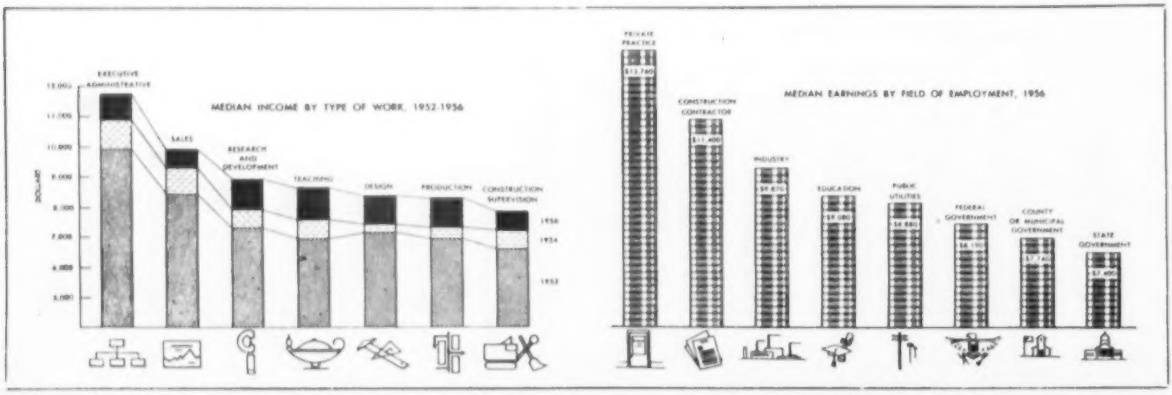
Long Term Decline

The report continues, "Since 1929 engineering salaries have declined substantially relative to earnings of all wage earners and relative to incomes of independent professional practitioners." Once again taking the long-term view, they state that "the differentials of engineers' earnings above those of the academically untrained labor force are still in excess of the cost of obtaining an engineering degree." This report, which arrives at a time when there is a temporary easing in the shortage of engineers, makes the book appear to be a sterling example of scholarly detachment. Actually, the book draws sharp criticism from other economists who point out that the statistics upon which the conclusions are based are "vintage" statistics and would appear to be in sharp conflict with the survey data mentioned elsewhere in this report. In contrast, the McGraw-Hill Department of Economics states that during the years 1953 to 1956, the median salary of engineers rose about twice as much, percentagewise, as the average earnings of all full-time wage and salary workers, almost twice as much as factory workers' earnings and substantially more than the net incomes of some other professions.

Another attack on the supply and demand conclusion concerns the fact that to be conclusive it must be active in a "free market." Actually, the job market for engineers falls far short of meeting the requirements for a free market.

The Pinch

The serious pinch in engineering salaries would appear to be in the middle age group where salaries are not particularly affected by the increasing salaries for college graduate engineers. In this area at the salary curve there is room for investigation to determine whether this is the point where the nature of engineers limits their value to industry because of their inability to step into managerial jobs, or whether this is a potential trouble area.



Charts show a healthy increase in income in all engineering occupations during the 1952-56 period. Will it continue?

Panel backgrounds for fixtures gave a decorative effect Beams and piping prevented continuous fixture assembies

Solved the problems in fitting

New Light to an Old Store

The job of relighting the second floor of downtown Keith O'Brien Co. department store in Salt Lake City, Utah, required a number of compromises dictated by the structure itself.

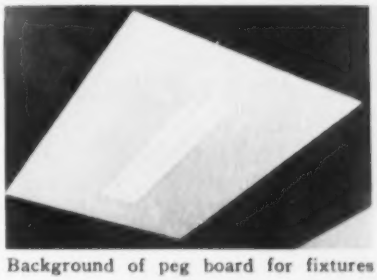
The contractor was not allowed to tear the ceiling. Existing wiring was armored cable, run concealed. Cross beams and columns divided the area into 20x16-ft bays. Existing sprinkler piping had to be maintained and sprinkler heads kept free of obstructions. As great a mounting height as possible was desirable.

Such conditions compelled the contractor to utilize the existing outlets, making short runs with surface metal raceway as needed, and to hang the fixtures just below the sprinkler pipes. In the front part of the floor, the new fixtures were hung in groups of two and three, as clearance allowed, and spaced for an added row across the building. In the leased department, at the back of the floor, the same restrictions prevailed but special fixtures were used.

The original fixtures were 4-ft, 4-tube units, with longitudinal glass louvers, hung one to a bay. In the owned department, at the front, the new fixtures are 4-ft, 4-tube, rapid-start units with plastic louvers. The new fixtures in the leased department each consist of a 4-ft, 4-tube unit, with egg-crate louvers, recessed in a 4x6-ft acoustic Celotex panel. The lessee furnished the assemblies for its own department.

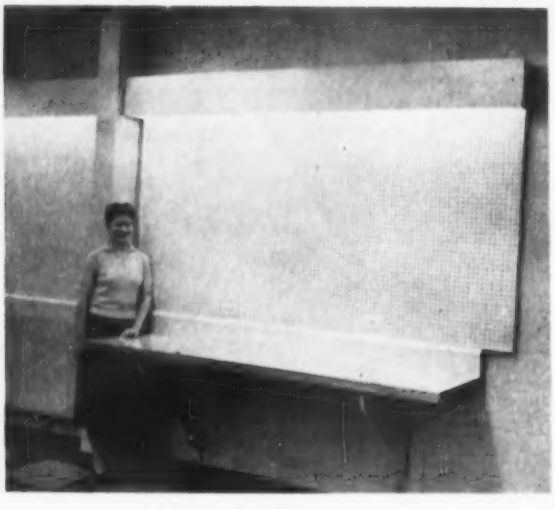
Illumination levels, ranging from 5 to 35 f-c on the counter tops, were raised to a uniform 65 f-c. While the new level may be regarded as conservative by some merchandising standards, the improved appearance and uniformity have brought favorable comment.

The contractor, Oberg Electric Co. of Salt Lake City, overrode the manufacturer's recommendations when hanging the fixtures in the owned department. The units normally are furnished with one twin-stem hanger to a fixture. It was desired to avoid tipping, sagging and misalignment after cleaning or relamping. The hangers, therefore, were placed crosswise to the fixtures. Also, extra hangers were secured to permit a mounting at each end and at each joint in the lighting groups. It was necessary to redrill the fixtures for this altered arrangement. Alignment and rigidity were secured in the leased department by running thin wires to the panel corners.



Background of peg board for fixtures

Previous fixtures gave spotty effect



Auditorium used for sales meetings also serves as lunchroom for employees. Along side walls are display boards and shelves (left) cove-lighted from above, and power receptacles

New G-E apparatus office

Surrounds Service

Many of the problems its customers face were coped with successfully in the completion of the new Apparatus Sales Division offices of General Electric Co. in Portland recently. First use of a new two-level system of underfloor duct called "Steelduct" in the Portland area was made. Being of modern metal construction with window wall glass and porcelain enameled panels, the wir-

Contractors Emory and Bohm show extra panel capacity

Two of three 15-ton packaged air conditioning units

Continuous rows of louvered fluorescent fixtures light the offices. Power for office machines comes through floor duct

Center Core

ing for its many electrical facilities had to be handled differently.

In order to meet the head office limitations on total cost, after the bids were taken and the contract signed, the electrical contractors, Emery & Bohm of Portland, had to redesign the electrical system to retain as high lighting levels as were desired and yet provide an economical installation. The building, including land, was said to cost something about $18.50 per sq ft.

Modern design leaves very little room for electrical conduit or facilities. Hence, most of the distribution was planned through the use of the new G-E underfloor Steelduct. The 14,268-sq-ft, single-story building, located in a colony of General Electric facilities in the Guilds Lake area of Portland at 2929 N. W. 29th Ave., was designed by Church, Newberry & Roehr, architects, to have a steel roof structure and insulated steel deck. (Pictured p 172, Sept. issue.)

The outside walls are window wall construction with aluminum frames and windows and porcelain enameled panels with fiber glass insulation above and below the windows. The building has a central air conditioning system, using three 15-ton G-E packaged air conditioning units. Facilities were likewise needed for a Western Union teletype room, telephone equipment room, and an electric kitchen off of an auditorium that doubles as an employee lunch room, exhibit and conference room. Offices are arranged around the periphery of the building, with the auditorium and service rooms in the center.

Lighting of at least 100 f-c was required. The final installation provides 110.

The duct is spaced so that the center lines of any partitions would come on a 12-in. mark, thus providing an outlet on each side of a partition. Inserts are spaced 24 in. apart. One channel is used for telephone circuits and the other for power, the same relative position being kept throughout to aid identification.

Total connected load for the building is 15 kw, on a three-phase, 120/208 system, 430 amp per leg. The building supplies its own transformation.

Future growth is provided for by blank sections in the main distribution panels. One panel was installed for all lighting circuits. In order to keep them separate another panel was installed for all of the underfloor duct circuits to convenience outlets.

Lighting fixtures are generally louvered Columbia fluorescent fixtures, although the flat panels with luminous covering are used in the executive offices.

Since the auditorium has a multiplicity of uses, it is made very versatile in its lighting. Facilities were made for future installation of dimmers of the fluorescent lighting units in the ceiling, although they were not installed at first. A small stage is provided with extra flood and spot lights controlled either from back of the curtains or from the rear of the auditorium. Along each wall are pegboard panels to which displays can be mounted. To illuminate these a cove containing a fluorescent strip is installed. Additional accent lighting is provided from swiveled spot lights in the ceiling. The electric kitchen adjacent is used by employees for their lunches or it serves for entertaining guests at sales meetings, etc.

John F. Gogins, manager of user sales for the Portland office, makes his headquarters here. Other G-E facilities in the area are the apparatus service shop and warehouse, lamp department and Hotpoint appliance sales.

Metal molding on wall supplements ducts for teletype circuiting in special room

Added light from lens down units and concealed cove behind tellers' counters

Montana's pioneering of 480-v brings

Billings Bank Benefits

Accounting offices well lighted by louvered fluorescent fixtures in parallel rows

While some utilities still ponder over 480-v distribution for downtown buildings, Montana Power Co. claims the honor of starting such distribution in Billings several years ago. And it is so successful that all recent office buildings are using the system. Notable among these is the Security Bank Building which, likewise, had several other interesting electrical design features engineered by Robert F. Cooke of Montana Power Co.

Historically the first 480/277-v system in Billings was for Mobile Producing Co. district offices. Owned by Socony Vacuum, the original idea was hard to sell but from then on was used by it in its own 42-story building in New York.

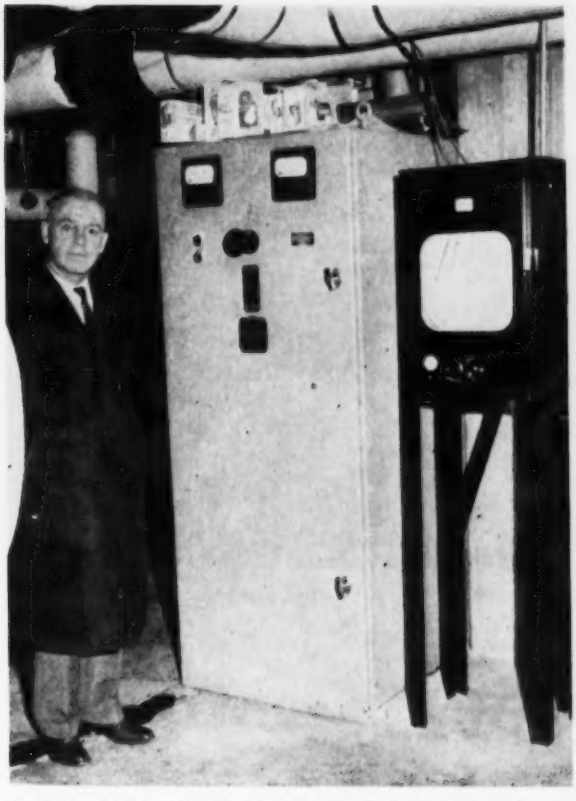
The particular value of the 480-v system is when air conditioning is involved. At the Security Bank a 350-hp synchronous motor operates the air compressor for the air conditioning system. The motor has a two-part winding and is connected by fluid drive to the American Blower Co. compressor. To further ease the starting torque, Electric Machinery Co. has furnished a field frequency relay in the starting.

The higher voltage enables better voltage regulation and smaller copper.

In addition to the 350-hp air conditioning motor, the modern demands of business machines in a bank and office building of this type require a 750-kva bank of transformers under the sidewalk to supply the building. Risers operate at 480 v supplying dry-type transformers, which reduce the voltage to 110/220 at each floor. This voltage is used for office machines and convenience outlets. The 277-v lighting is taken directly from the 480 distribution. Each floor has two panels clearly marked. These are for the 120-v and for the lighting.

A 2,500-amp Trumbull bus connects the transformer vault to the main board where there is a 600-amp main breaker for the synchronous motor, two 200-amp power panels and two 100-amp lighting panels at 480 v. A 1,600-amp bus duct riser is bolted to the stack and it is from this that taps are made for the individual floors. Provision is made for 10 stories, although the building at present only has six. Floors from the fourth on up are of cellular Q-floor, which is used for the lighting and telephone line distribution channels. Fiber duct imbedded in the concrete slab was used for the lower floors with outlets spaced every two feet.

Many lighting ideas are incorpo-



Robert Cooke stands beside field frequency relay, which smooths the starting of 350-hp compressor motor

rated in the building, particularly in the quarters of the bank itself on the first and second floors and basement. General lighting of the main banking area comes from 4- and 8-ft slimline troffers with lamps operated at 277 v, 430 ma. These are covered with Corning low-brightness lenses. Additional Holophane incandescent directional units are located directly over the tellers' cages for extra down light. General lighting is 115 f-c on the banking floor and 150 f-c over tellers' cages. Under a balcony section, a number of Holophane lens units are set flush in the ceiling.

Back of the tellers' cages and concealed by an overhang a slimline lamp has been mounted to eliminate shadows behind the tellers. There is also a strip of slimline lamps along the outside wall above and back of a dropped ceiling. This is used as night lighting and to light the bamboo-stick draperies over the large windows along the street sides.

In the offices, Columbia surface mounted steel egg crate louvered fixtures with Albolite sides deliver from 75 to 90 f-c at the working plane. All of these are 4-ft units, using standard cool white lamps. All this is directly switched with the new 277-v wall switches.

Another feature appreciated by the customers is the heated sidewalk in which electric heating cable is installed.

Main banking lobby general lighting is inset in ceiling with edge of dropped ceiling cove for drapery, night light

Bank had extra mercury high intensity street lamps installed to floodlight exterior colored tile building face

Classroom light distribution is ideal and brightnesses within proper ratios

Ceiling incandescent lamp troffer

Has Electric Daylight Control

Control is one of electricity's greatest attributes. Thus, even in controlling daylight for a school where its own electric lighting assumes a stand-by and supplementary role, electricity performs through control to serve the community.

Nowhere is this better illustrated than at a new elementary school in Manteca, Calif., for which Mayo, Johnson & deWolf of Stockton were architects, Williamson & Vollmer Inc. electrical engineers and Collins Electrical Co. Inc. of Stockton the electrical contractor. For this school an ingenious louver system over a continuous skylight was designed by F. H. Logan of Western Asbestos Co.

Aluminum louver grid over skylights

Aside from the even distribution of light, both natural and electric, the system is notable for the Minneapolis-Honeywell master control system, both for the heating and ventilating and the lighting and louvers. Through its Modutrol master panel located in the principal's office, complete automatic or manual control, both of heating and lighting, is provided.

This gives a coordination of total environment that school people feel is necessary for the child. Nothing is left to the teacher to control or decide. In fact, teachers are given an indoctrination on leaving the controls alone.

Dimmer on Lamps

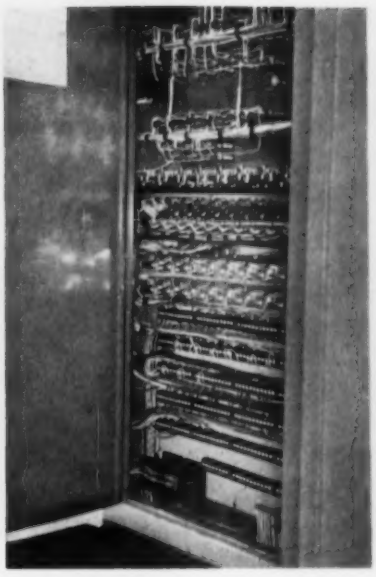
As daylight increases or diminishes artificial lighting is automatically built up through a Ward Leonard dimming system so that there is no noticeable transformation or turning on or off of light. Furthermore, control is obtainable of the daylight under ideal conditions for the use of visual-audio teaching aids.

The Solartron skylight system consists of a series of aluminum baffles and tiny louvered shields mounted saw-toothed fashion in long rows above a skylight glass of the diffusing type. These baffles are angled to the north so that no direct south or overhead sunlight comes through. Rather, the light is bounced against the aluminum baffles for further diffusing before it goes through the skylight into the room below.

The electrical control system does two things: (1) it can be made to operate louvers underneath these baffles that shut off the light coming through them when the room is to be darkened for projection of pictures or movies, etc.; (2) it automatically brings up the intensity of light from the incandescent lighting units in the ceiling that are an auxiliary light source for dark days or evenings. This type of system results in considerable savings, both in lighting equipment and in energy cost. The Manteca school has a total connected load of 55 kw, of which 52 kw is for classroom lighting.

What the thermostat on the wall in the classroom is to the heat control, a photoelectric cell mounted in a small skylight well 4x4 ft adjacent to the principal's office determines the amount of electricity that will be sent to each of the lamps in all of the classrooms. It does so actuating relays in the control center that operate motors on top of the saturable reactors feeding the lighting circuits. Power comes to the reactor

Photoelectric cell in small light well



Back of lighting and temperature panel

Saturable reactor for lighting circuits

through disconnects into the control panel. A manual by-pass on the saturable reactor is provided so that the entire system can be put on full intensity should it be desired.

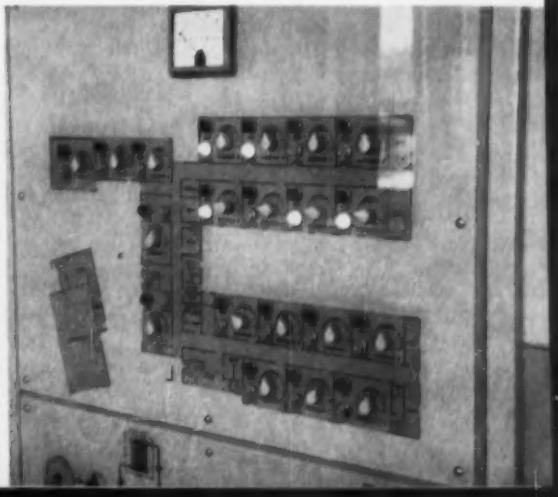
When a teacher wishes to darken a classroom for audio-visual work, she flips a switch near the door which cuts out the automatic operation of the lighting units in the room and starts the 24-v, 17-w motor drive that slowly operates the louvers underneath the baffles. This cycle runs about four minutes, giving her time to set up and thread a projector and get the class organized before the lighting level is reduced to about 8 f-c. When the projection is finished the switch is flipped back and the lights go back on automatic control as the louvers are gradually opened again.

Master control is centered in a panel in the principal's office. On the face of this panel is a map of the school. It is called a supervisory data center for the control both of heating and lighting. There is a knob and two push buttons on each of the classrooms in the map. To determine what the temperature is in a room, the principal can push the temperature button and get a reading on the meter above. Likewise, the lighting in the room can be determined by the second button. The temperature is maintained by individual thermostats on the walls of each room but the control is centered back at the panel. The temperature can be adjusted by turning the knob for that individual room if desired. So far air conditioning had not been installed but provision is made to use it should it later be required.

The lighting fixtures for the classrooms have been developed especially to go with this system. They consist of a 2x6-ft box set flush into the ceiling, painted white inside, in which is mounted a 750-w silver-bowl incandescent lamp, used because of the simplicity of dimming incandescent. Around the bowl of the lamp and flush with the ceiling are three sections of Honeylite aluminum louver. By themselves, the incandescent lighting units for this school at night produce 20 f-c. Windows in the room are reduced to a mere vision strip and even on bright days with evenly distributed intensities from the skylight of from 50 to 60 f-c, the outside brightness through the windows is not objectionable.

Time, sound (left) and lighting control panel (right)

Room map with light and temperature master controls



President Forte (center) receives the gavel from International President Morr as Gaffney (left), Paxton and Tubbs look on

Northwestern Section is told . . .

IAEI Is At the Crossroads

H. S. "Hal" Morr, the man with many hats who serves as president of both the Northwestern Section and the International Association of Electrical Inspectors, set the keynote for discussion at the 31st annual meeting of the Northwest Section when he said:

"I believe that the IAEI has arrived at a crossroads and the decisions made this year and next may have a profound effect upon the kind of an association the electrical inspectors will have for years to come."

As he spoke to the 180 delegates and their wives at Spokane, he was referring to a need for strengthening the IAEI organization through better individual interest and participation from members, better financial support and increased service from International headquarters by addition of a third electrical field service employee.

Emphasizing his point, he said ". . . if services are to be maintained on a sound fiscal basis, this association should give consideration to either increase its income and employ an additional technical assistant or curtail services to members and reduce expenses."

Morr told the meeting that the National Electrical Code is at stake as the IAEI members make their decision as to which way the necessary changes will go. Members did not seem to favor curtailed services.

He said ". . . this doesn't mean that the National Electrical Code has to be maintained on the present system under which inspectors, installers, manufacturers and other interested persons can meet in open session to present their various viewpoints and where the final decision on any part of the standard is determined by majority vote. You know full well that there are special interest groups that would be happy to get control of and even socialize the National Electrical Code. There is no chance of that happening as long as the code remains the product of a democratic process conducted in harmony and cooperation by all interested elements. I am confident that IAEI will continue to play its important part as a leader in this cooperative process."

Key inspectors are needed to assist with the gathering of data about fires originating from the improper use of electricity, according to Everett E. Cogan, Chicago, technical assistant secretary of IAEI.

During the calendar year of 1956 only 97 cities out of 1,900 contacted reported to headquarters on the causes of local fires. He said the ever increasing use of electrical appliances is causing a simultaneous increase in electrical fire hazards and in fires resulting from the improper use of electricity. Reports from key inspectors reflect growing concern about wiring equipment that has been worn out in service.

Cogan also pointed out that investigators and reports by key inspectors would probably reduce greatly the number of occasions that electricity is blamed for fires. Re-emphasizing this point, Charles L. Smith, International secretary-treasurer of IAEI, said:

"I don't think we should charge to this great servant — electricity — those fires not known to be misapplication of electricity." He followed this by citing the figures that show that investigations by electrical inspectors at the scenes of fires had the effect of greatly reducing the percentage of fires charged to electricity.

Cogan reminded members that April 30 is the deadline for inclusion in the membership directory carried in the *News Bulletin*. The directory is to be published every other year and dues must be paid by the dead-

Charles Smith, standing, served as moderator for the symposium on aluminum. From left are Keith, Briggs, Bergan and Stiner

line to qualify. The names of new members will be published in later issues as they join the organization.

It was during this first day business session that W. L. "Bill" Gaffney, secretary-treasurer of the Northwestern Section, told members that their proposals for changes in the National Electrical Code for 1959 must be submitted by December 1957. For all practical purposes, for changes approved by the group, those approved at the Spokane meeting were final. Individuals still would have until the December deadline.

In his role as president of the Northwestern Section, Hal Morr told about his visits to the various chapters. He reported:

"The enthusiasm in these meetings and the interest expressed by individual members seem to be conclusive evidence that our members want a strong, active electrical inspectors association. And yet, there sometimes seems to be an element of indifference that prevents us from achieving the kind of an organization we want. This is not limited to our section, as similar comments have been made about other sections."

As he encouraged members of the Northwestern Section to make a new appraisal of their interest and of the benefits available by active participation in the association, Morr restated the relationship of participation to the effectiveness of the National Electrical Code.

"The Northwestern Section long held the reputation of contributing more constructive recommendations for code changes than any other section. I doubt if we now hold that position of leadership, but there is no reason why we can't, considering the experience available in this area."

In order to fill important committee assignments with members who are ready and willing to assume the responsibilities, Morr has recommended to the Northwestern executive committee that the entire committee structure be revised. Normally a revision (new appointments) would take place in 1960.

Roy Crosby, right with Gaffney and Morr

Another proposal made to the executive committee is that the expenses of the secretary or the president of the section be paid to make it possible for one or both of the officers to attend chapter annual meetings.

Morr said: "Some other sections have done this for some time. It has proved to be a great stimulant to the membership and has brought about better understanding of our operations."

Morr reported that the executive committee approved of the plan and will send W. L. Gaffney, secretary-treasurer, to chapter meetings next spring at the expense of the Northwestern Section. The practice will be reviewed annually by the executive committee to determine whether it is producing the desired results and whether the expense is justified.

On membership, Morr reported to the meeting that the membership of the Northwestern Section was higher by 200 in 1946 than it is at the present. During the same period the International membership has increased from about 3,600 to more than 9,000.

In conclusion, he said:

"In reflecting on these remarks, it occurs to me that a few of them seem a little critical, or perhaps a

E. E. Cogan makes appeal for more key inspectors to gather fire data

little discouraging. Please believe that they are not intended that way. There is always room for improvement and it is my firm conviction that renewed interest among our membership will again build the Northwestern Section into the most active and effective section in the association."

Symposium

A highlight of the meeting that turned out to be the conversation piece was a symposium on the use of aluminum products in electrical wiring systems. With Charles Smith as moderator, the symposium panel was composed of R. S. Keith, Chicago, Kaiser Aluminum & Chemical Sales; Kent P. Stiner, Detroit, product engineer coordinator for Bull Dog Electric Products; Martin D. Bergan, Elizabeth, N.J., engineering technical director of Thomas & Betts Co., and Paul L. Briggs, Spokane, manager of Briggs Electric Co., an electrical contracting firm.

With Keith acting as lead-off man of the discussion, the group was given the general information about aluminum, covering comparative conductivity, cost and the world supply. With this background, Stiner, a former electrical inspector in Detroit, talked about the acceptable methods known today for using aluminum and copper together in wiring devices currently available. Briggs presented his experience as an electrical contractor in successfully using aluminum conductor in a large new high school now nearing completion in Spokane. Bergan presented a detailed slide talk on the use of compression connections.

The symposium at Spokane was the trial run on a series that will be carried to various other sections of the country by the IAEI, with most of the same panel members participating.

Informal comments of many delegates after the session indicated the value of the symposium as an educational look into the future as more and more aluminum conductors and other components make their appearance in installations across the nation.

Other meeting highlights included exhibits of the products of various manufacturers in the meeting room and the room adjacent to it. A banquet on the second day of the meeting featured Carl Hoffman, Washington Water Power Co., who served as master of ceremonies.

A major portion of the sessions was utilized for code discussions as the Northwest Section attempted to get its suggested changes on record before the year end deadline. (See Contractors News Letter.)

Another featured speaker was M. W. Brandon, vice-president of Underwriters' Laboratories, New York.

New Officers

New officers unanimously elected by the delegates to serve during the coming year are: Park H. Forte, Boise, president; James A. Paxton, Spokane, first vice-president; Edward M. Tubbs, Bellingham, Wash., second vice-president; W. L. Gaffney, Tacoma, secretary-treasurer.

The executive committee is composed of J. F. Gray, Portland; Eldon L. Shirley, Billings; J. D. Gawne, Seattle; J. Hyde Stayner, Salt Lake City; T. M. Widrig, Seattle; B. A. Travis, Seattle.

Members of the executive council are Cliff Atkins, Portland; Bill Volheye, Portland; Chet Kirsop, Olympia (alternate); and also H. S. Morr and Bill Gaffney who are past presidents.

Meetings

Places for annual meetings of the Northwestern Section through 1961 were announced at the meeting. Billings will be the host city in 1958, Seattle in 1959, Portland in 1960 and Boise in 1961.

Meeting Committee

Roy Crosby, Spokane, who is with Washington Water Power Co., was general chairman of the annual meeting. Serving with him were R. E. Blazen, Westinghouse Electric Corp.; James Paxton, Spokane Inspection Department; Pete DeFeyter, Power City Electric; Roxie Countryman, State of Washington Inspection Department; Elmer Johnston, Strohecker Co.; Carl Hoffman, Washington Water Power Co.

Nearly 200 delegates and wives are pictured by the beautiful new pool on the fifth floor of the Davenport Hotel, Spokane

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Spending diversion

Government defense spending, while totaling about the same in millions, either has been shifted into different channels or cut back in others enough to bring quite an economic slump to many localities in the West, where boom conditions depended upon military construction and pay rolls. Not only has this canceled some projects upon which electrical contractors and suppliers were looking for volume, but it has affected retail business in such towns and cut pay rolls which in turn affects the new home construction market. All this calls for readjustment —an ugly word to those who have to do it.

Good otherwise

Otherwise, business for the rest of the year looks good. People still migrate to the West. Skilled manpower is scarce in several areas. Retail sales have been up, except in Portland and Spokane areas. Considerable remodeling and modernization of existing homes and buildings have been noted.

Rental

Residential building has shifted from individual homes to multi-unit dwellings for the first time since the 1944 wartime apartment expansion.

Metals uneasy

Copper's uneasy status was a big worry at the Mining Congress meeting in Salt Lake City. Market price, both for scrap and new copper, threatened to make mining uneconomical, which could seriously affect employment in the copper states of Montana, Utah and Arizona. Wire prices have deviated from published lists to "whatever the competition is."

Aluminum bomb

Southwire Co. of Atlanta threw out a bombshell to try to bring the industry to its senses. It announced a reduced list on ACSR and aluminum-covered wire at a "price level more nearly in line with those actually being quoted." It reduced ACSR 3¢ and covered wire from 15 to 20¢, saying, "The price confusion in the industry today has created unfair pricing situations. In the interest of providing all our customers with a consistent and stable price, we publish these sheets with the hope that confidence on the part of all aluminum wire buyers will be re-established." While the move caused talk, there was doubt expressed in the industry that this would quiet the jitters.

Act now on code

If you have code changes to make, the deadline for the 1959 edition is Dec. 31. Time table for the next code revision was announced by NFPA. Receipt of proposals, Dec. 31, 1957. Panel reports to correlating committee, January to May 1, 1958. Panel reports published, July 1. Period for study by industry July 1 to Dec. 1. Code panels report to correlating committee Jan. 30, 1959, changes submitted to NFPA March 20, 1959, review by electrical section at NFPA annual meeting, May 1959, and publication of new code September 1959.

New directors

Two Westerners elected to the board of governors of the National Association of Electrical Distributors are C. O. Armstrong, president of Argo Electric Supply Co., Huntington Park, and H. F. Boeger, State Electric Supply Inc., Oakland. Both were elected at the Western region convention of NAED in Coronado and take office Jan. 1.

Abuses alarm

Circuit breaker interchangeability may be desirable commercially, electrical inspectors agreed at the Northwestern Section annual meeting in Spokane, but so many abuses of the product have caused them to pass motions demanding that manufacturers limit them. The demand originally was that they be made nontamperable, that standardization among manufacturers of methods of attachment be made and that they be noninterchangeable with breakers of higher rating. Manufacturers protested that nobody was making them that way. The inspectors retorted: "We are asking that you redesign all circuit breakers so that the homeowner or electrician cannot jump them from 0 to 100 amp." What inspectors want is that breaker units be redesigned to provide protection similar to that afforded by the type S fuse.

One rating only

Other actions taken at Spokane inspectors' meeting—Where dryers or water heaters have dual ratings, they asked that Underwriters' Laboratories rate only the highest on their labels so that wire sizes for the maximum can be provided. . . Protest was also made of higher-wattage lamps used in ceiling fixtures, particularly those mounted on combustible materials. . . Also voted was to require overcurrent protection on temporary wiring circuits.

Home rates rising

Home pricing has the building industry somewhat alarmed also, not so much by public advertising and statements as from side overtones. FHA Commissioner Norman P. Mason told the Pacific regional conference of National Association of Home Builders in San Francisco that discounts on mortgages insured by FHA seemed a "necessary evil." FHA increased interest rates to 5¼% and permits discounts ranging from 1-2½%. Later, Mason warned against the growing resort to second and even third mortgages, evils which the FHA was established to do away with.

Prefabs sought

High building labor costs caused the NAHB thinkers to consider and propose more prefabrication and factory unitizing of components from which to reduce on-site assembly time to lower minimums.

NECA elections

Three vice-presidents of Western districts of National Electrical Contractors Assn. will be voted upon at the national convention in Cincinnati Nov. 11-16, as well as the re-election of the president, Oliver Burnett, and vice-president of line construction, Charles W. Mosely. Normally, the terms of the vice-presidents for District 5 and District 9 are to be voted on, but the District 8 vice-president, Ralph Johnson of Denver, has resigned and a replacement for him will probably be voted upon. J. D. O'Connor of Sacramento has been nominated for District 9, Phil Robins of Salt Lake City was named by District 8 conference to take over that district's vice-presidency again at a meeting at Sun Valley last month.

Managers change

Chapter managers have been like a backfield in motion. Exceedingly capable and advanced thinking, Laurence Rodgers, manager both of the Northwest Line Constructors and the Oregon-Columbia Chapter, resigned under fire. The enterprising new manager of the Montana Chapter, Robert P. Burns, was selected to fill both positions as of Sept. 15 and Earl Coyne became manager of the Montana Chapter. In Seattle, John Majerus stepped down as manager of the Puget Sound Chapter to take over management of a new Southwest Washington Chapter covering Tacoma, Olympia, Aberdeen, Hoquiam and Raymond, with headquarters at Tacoma. Maynard Sundt, who had been promotion manager of the Puget Sound Chapter, was appointed manager.

Re-elect officers

Montana Chapter, NECA, re-elected its officers and directors at its annual meeting in Butte Sept. 7. These officers are: Galen Naylor, Billings, president; Art Stuart, Bozeman, vice-president; Keith McConnell, Anaconda, treasurer; Ross Allen, Billings, secretary; A. L. Rowe, Great Falls, governor. Earl Coyne of Butte was appointed manager. Directors include Trygve Kravide, Havre, Charles O. Schmidt, Billings, Walter L. Scheid, Lewistown, Thomas Shine, Bozeman, G. E. Cissel, Livingston, Charles Power, Kalispell, Martin Nelson, Glasgow. The association voted appreciation of the position of Montana Power in its requests for an increase in rates.

Consider bylaws

Northwest Conference of NECA Chapters held a meeting in Seattle Sept. 13 to discuss the revision of the benefit fund agreement and proposals for the revision of the bylaws of NECA in regard to the establishment of branches by the national office. No formal action was taken, although the various aspects of the proposals were really discussed. The situation in Alaska, where labor troubles had been common in previous years, was reported greatly improved by W. R. Grasle, District 6 vice-president, following a trip there. John A. Schaefer, Alaska chapter manager, has also initiated a number of educational programs.

Lost in the rush

The Federal Construction Contract Procedures Act knocked on the door in the final months of the 85th Congress but the measure was shoved out of the way by the rush home of the legislators. At the last moment, the obstructing "five-foot amendment" was eliminated. Strong efforts will be made to get it passed at the next Congress. A more cooperative industry action is being planned by the Council of Mechanical Specialty Contracting Industries, including NECA, NAPC, Sheet Metal & Air Conditioning, and Mechanical Contractors Assn.

Thanks given

In appreciation of his serving local union No. 6 for 20 years as its business manager, Charles J. Foehn was honored by his members of IBEW on Aug. 14 by presentation of a 21-in. color TV set. Foehn is also a member of the San Francisco board of education and a member of the executive council of IBEW.

50 years old

Golden Anniversary celebration of the chartering of Local 595, IBEW, in Oakland, filled the municipal auditorium with 1,000 people for the banquet presided over by Homer E. Wilson, local president, Saturday, Sept. 14. Oscar Harbak, international vice-president, represented the international office and prominent speakers addressed the crowd.

Rural wiring

Thomas Branch, rural wiring specialist of REA in Washington, D. C., was the featured speaker at the fall meeting of Rocky Mountain Chapter, IAEI, at Canon City, Colo., Sept. 27-28. Branch, who attended the Western Section meeting in Chicago, was able to report on that meeting. Howard Pease, chairman, conducted the meeting. Speakers included H. J. Hearn on "Conduit Versus Cable," Howard E. Scott, manager, Colorado REA, and Ancher Nelson, REA administrator. A tour of the W. N. Clark plant at Canon City and a trip to the Royal Gorge Park were included.

To the islands

Matt Cabott goes to Hawaii Oct. 1 to take over a manufacturer's agency for the Day-Brite and Rambusch lines of lighting equipment. He resigned as sales manager of the California corporation recently established by Day-Brite, as of Sept. 30. S. M. Bixler, vice-president and general manager of the California plant, will be sales manager.

More needed

Graybar Electric Co. has started construction of a new 47,000-sq-ft office, warehouse and display center in Van Nuys, Calif. This was announced recently by S. W. Scott, Pacific district manager, Los Angeles.

IES chiefs

A. E. Fleming of Salt Lake City succeeded J. D. Whitnell of Phoenix as vice-president, Intermountain Region, Illuminating Engineering Society, and Whitnell was elected a director. "Gene" Fleming was instrumental in forming the Utah Chapter and was its first chairman, from 1946 to 1948. He is district manager of the apparatus department of General Electric Supply Co. for the region. Whitnell is commercial sales engineer for Arizona Public Service Co. and was first chairman of the Arizona Chapter.

More farm help

Interindustry Farm Electric Utilization Council workshop was held at Denver Sept. 29-30 and Oct. 1 as guests of the Colorado Farm Power Council, which has been active in the area development of more farm applications of electricity.

Ready for golden year

Plans for the 1958 national convention of the National Association of Electrical Distributors in San Francisco June 8-12, 1958, are already being made by the Western Region members. Group meetings are being held to develop the program, to which some two to three thousand are expected to come. Instead of manufacturers' exhibits, the usual conference booths, without advertising or products, will be arranged for in the civic auditorium where the meetings are to be held. A series of regional meetings will be held in all areas of the West early in 1958, before and then following the national convention. Plans are to hold them in Montana, Washington, Oregon, northern and southern California and Utah, according to William Jewell, manager.

Deaths told

Ed Pierce, pioneer contractor-dealer in Vallejo, who only last month announced the sale of his contractor business to his son, Harold, died suddenly Sept. 14. . . . Another pioneer contractor, Alex McGaw of Castro Valley, Alameda County, died late in August. . . . IES in Los Angeles reports recent death of members Clayton T. Gibbs, Harold S. Moody and E. F. Keating. . . . Inspectors association reports the passing of Jimmy Hutchins, Bill Walters and Robert L. Lloyd.

Moves of men

Among lighting men—F. Harry Logan, who for the past 10 years has been school daylighting engineer for Western Asbestos Co., San Francisco, has left that firm to join Lillis & Smith, architects, at 912 Tennessee Ave., Vallejo. He became the planning consultant on engineering features of lighting, heating, air conditioning, etc., on Sept. 16. . . . Stanley Lindahl, who founded the Light Control Co., Los Angeles, has sold the company and has become a manufacturer's representative for it . . . . James Dieffenwierth recently joined Shalda Mfg. Co. of Burbank as sales engineer. . . Milton Very of All-Brite, San Francisco, was made Dallas district manager.

Clear the path

Spectacular public showing of a new electronic radio control of traffic signal systems that can clear traffic for emergency vehicles such as fire trucks and would be a big aid in evacuation was made at San Francisco Aug. 8 by El-Tec, Electronic Protection Inc. subsidiary of Standard Coil Products Inc. Arch Monson, Monson Electric Co., San Francisco distributor, and El-Tec demonstrated the equipment at the dinner at the Fairmont and a street demonstration outside later. Arthur Siegal, Selo Electric Co., Seattle distributor, also participated.

PCEA technical committee rolls its own . . .

Street Light Movie

All those who have had the experience of telling a street lighting story to an audience know the problems of selecting the language, obtaining the photos and describing the scenes that an instant eye-view of the actual scene would give.

Members of the technical subcommittee on highway lighting of the Pacific Coast Electrical Assn., of which Gilbert A. Trosper, Pacific Gas and Electric Co., is chairman, have had much experience with this problem. They know that it takes many selected words, supported by good photos and slides to present street lighting problems adequately.

Early in 1956 this subcommittee discussed the use and advantages of good motion pictures to bring to assemblies and audiences night-time pictures of traffic lighting as seen by average motorist eyes. It was decided to try a 100-ft roll of a new Eastman film that was fast enough to record night street scenes. Special lighting, other than normal street lighting, was not needed when using this film with a good camera and lens. Committee Member Bruce Kunde, Line Material Industries, owned such a camera and had taken night pictures. He volunteered to take the picture.

The 100-ft test roll turned out so well that it was agreed to prepare a short picture suitable for a program at the California State Traffic Conference at Sacramento in October 1956. Numerous committee meetings were held. A story and narration were prepared. Locations were selected and film was secured. The "crew" was ready to begin shooting about the first of April. The crew consisted of the San Francisco members of the subcommittee.

Among the many problems that arose was that of obtaining actors and extras. Many of these were lined up by James Burson, Westinghouse Electric Corp. Local residents helped out. The Bay Cities Ambulance Co. participated and the police departments of Emeryville and Burlingame were very cooperative. Special efforts to help were made by Ernie Hill of the electric department of the city of Burlingame. All those who participated did so willingly, with the knowledge that any contribution made to reduce the tragic list of traffic accidents was worth the effort.

When the film was completed, the commentary was written and narrated by Peter Garippa, General Electric Co. Incidental music and narration were then recorded on magnetic tape and synchronized with the picture.

The motion picture was then shown at the 1956 conference at Sacramento, where it was well received.

Some of the subjects covered by this film were: (1) good and bad lighting at intersections for pedestrians as well as vehicles; (2) blinding glare and how it conceals dangers; (3) seeing night traffic in wet weather; (4) effects of light and dark clothing; (5) locating highway on and off ramps; (6) one-side lighting vs lighting of both sides; (7) white way and business street lighting.

In the preparation of this movie, it was the committee's purpose not only to prepare material for the program but to make available a nontechnical, noncommercial film on good and bad street lighting—a film that represented street lighting as actually seen by the human eye, not a theatrical representation. The visual conditions of street lighting problems can be taken to an audience instead of transporting the audience to the scene.

The picture runs for 17 minutes and can be used for information as well as instruction to the layman. Prints can be purchased for $100 each by contacting the Pacific Coast Electrical Assn., 530 W. Sixth St., Los Angeles 14.

Grateful acknowledgment is given to the following persons and organizations who assisted in the preparation of this motion picture: Ernie Hill, then with the electric department, city of Burlingame; William Briggs and the Bay Area Ambulance Co.; Wilsey & Ham, consulting engineers, Millbrae; city police departments of Burlingame and Emeryville; Pacific Gas and Electric Co., Oakland; State Division of Highways, San Francisco.

Title backgrounds are actual scenes

Fast film was shot through windshield of a car with only street illumination

After the technical sessions . . . . . what's more fun than a picnic?

President Barrett speaks frankly on the profession at the . . .

AIEE Pacific General Meeting

Visitors to the AIEE Pacific General Meeting in the atom's home town enjoyed a stimulating three days of technical discussions; pleasurably diluted with field trips to several of the large hydro developments, the Hanford Works and a broad schedule of social activities. At ease in a soft shirt, General Chairman Owen Hurd conducted a meeting that lacked nothing in technical content but gained a good deal in "neighborliness" over similar meetings in big-city hotels.

In his opening address, Institute President Walter J. Barrett discussed the implication of the so-called San Francisco policy with regards to other professional groups, such as NSPE, EJC and ECPD. He stated that the orderly growth of the institute would seem to be dependent upon each of the groups having defined areas and objectives so as to avoid overlapping confusion and conflict. He pointed out that in his opinion the San Francisco policy clearly defines the reasonable area of operation of each of these groups. Operating under this pattern there is plenty for each group to do without the possibility of working at cross purposes.

Passing from this topic, President Barrett told of the procurement of a suitable site in downtown New York adjacent to the United Nations building as the future home of the founder society's headquarters building. Price tag for the whole project: $10,000,000. President Barrett explained that fund raising would be under way in the near future, with the bulk of the financing being taken care of by industry but with ample opportunity for participation by the membership.

Reviewing the progress that has been made in atomic energy for peacetime use, Francis McCune, General Electric Co. vice-president, stated that rapid industrial progress in peacetime atomic energy is bound to convince the public and government representatives that there is more benefit in private atomic development than in government control. A review of the tremendous strides made in military fields as well as progress in the development of material sources led him to the conclusion that solution by private industry of technical problems delaying production of economically competitive atomic power will remove many political and economic problems. He stated: "It is not and will not be an easy task to make electricity from nuclear energy at a cost competitive with chemical fields in this country but I am confident that this goal will be achieved."

Dr. Glen Wensch read an address by U. M. Staebler, discussing the objectives of the AEC and its power demonstration program. Speaking for the AEC, Dr. Wensch indicated that it was the objective of this program to achieve economic technology and not to enter the power business.

Power Generation—Gas Turbines

J. T. Madill, presiding

Responding to an increasing interest on the part of the utility industry in the application of gas turbines to power systems, representatives of three manufacturers presented papers which concluded that the gas turbine is a reliable device, ready, willing and able to take its place economically in the power generation field.

Power Generation—Hydro

R. L. Earnhart, presiding

Things hydro having high interest in the Northwest brought out a series of very worth-while papers. The Corps of Engineers D. R. Cox and R. L. Krahn presented a paper that compared friction and windage losses with generators coupled and uncoupled to the large Kaplan turbines. Comparison of the tests indicated a 13% error resulting from conventional testing methods with the turbine connected. Results would indicate that the uncoupling technique was both practical and of considerable value in determining friction and windage losses in large machines. In a second paper entitled "Transient Performance of Excitation Systems," Robert L. Krahn called attention to the fact that today's continuously acting voltage regulators have obsoleted present-day definitions for transient performance of synchronous machinery excitation systems. His paper described present-day concepts and explained why the newer type of excitation systems are not compatible with these concepts. In addition, his paper discussed the ideas currently under consideration in the industry for more correctly indicating the performance of rheostatic and continuous systems.

Presenting the planning and design considerations for Ice Harbor power house, G. H. Von Gunten and J. R. Kline's paper showed how power and navigation requirements had to be integrated with irrigation, recreation, fish and wildlife, and flood control considerations. Resulting noteworthy features of the Ice Harbor project include large radial spillway gates, the world's highest single lift lock and the most powerful propeller-type turbines yet constructed.

Westinghouse Electric's R. A. Baudry covered the development and performance of Kingsbury-type thrust bearings and concluded that present-day processes and know-how will enable our manufacturers to produce satisfactory thrust bearings and concluded that present-day processes and know-how will enable our manufacturers to produce satisfactory thrust bearings of high reliability for any machines presently contemplated.

Committee chairmen—Front row, L. P. Reinig, Mrs. C. R. Bergdahl, Owen W. Hurd, H. A. Carlberg, F. J. Mollerus. Back row, S. M. Rhyneer, D. W. McLenegan, W. J. Dowis, F. P. Robinson, H. A. Broderson, R. B. Britton, Roy C. Hoffman

In a similar vein, Los Angeles Department of Water & Power's F. B. Looper discussed the performance of generator thrust bearings at the Hoover power plant.

Nucleonics

I. V. Kresser and W. J. Dowis, presiding

The tri-cities' meeting naturally catered to the atom. In discussing reactor safety systems, Ivan Jacobs of G-E stated that even though safety is the prime objective of nuclear safety systems the record of false scrams will be the basis on which future systems will be most harshly judged. He indicated that while safety and reliability seem to be diametrically opposed that "great improvements in continuity of operation can be achieved without sacrifice of safety."

In a subsequent paper General Electric's S. Levy, in a detailed discussion of safety in nuclear plants, concluded that with sound administration, experienced personnel and strict operating standards and procedures nuclear plants can be operated safely.

In a joint paper by A. F. Ariey and E. P. Peabody, safety and performance of nuclear and conventional power plants were compared. Paying tribute to present-day advancements in instrumentation and safety devices, they concluded that operating experience with nuclear power plants should compare favorably with conventional plants in safety, reliability and ease of operation.

The problem of waste disposal was discussed by Ward G. Spear of the Hanford Laboratories, in discussing work his group had performed in tracking the underground paths of radioactive materials dumped on the sands in the Hanford Atomic Works reservation. Several hundred test wells have been drilled so that track may be kept of the movement of underground water so as to avoid possibility that they might menace adjoining water sources.

A joint paper by A. R. Jones and R. L. Witzke of Westinghouse Electric looks forward to the day when nuclear problems will be operational rather than economic. In accepting the premise that nuclear plants will be only slightly more difficult to operate than conventional plants, they strongly urged the industry to study the relative costs of operating various reactor types since this information will bear heavily on the final acceptance of any reactor cycle.

J. O. Orton presented a challenging paper on optimizing reactor design on a digital computer. Here, Orton described the forte of the automatic computer, which is to do engineers' work at many times the speed and reliability of the hand methods used by engineers. Since a good deal of optimization will be required before reactors become commercially useful in the power industry, it appears that there is no limit to the potential use of computers in

President Barrett and student engineers . . . don't worry about the future

the design of reactors.

Transmission and Distribution

E. C. Starr, presiding

Earl Baughn discussed Washington Water Power's new Spokane-Lewiston 230-kv transmission line, featuring the use of wood pole structures instead of steel. He pointed out that all-aluminum conductor filled the bill and enabled his company to investigate tensions low enough to prevent dangerous conductor vibrations without the use of dampers.

In proposing a method of simplified sag calculations for power transmission lines, Los Angeles Department of Water & Power's Francis J. Hubert proposed the use of parabolic equations rather than customary equations, which greatly simplifies the effort involved in determining sag and appears to be within the required accuracy.

Martin Lantz, BPA, presented a description of power system short circuit calculations using the digital computer. Use of the digital computer would appear to have certain technical advantages over network analyzer methods, particularly in the area of calculation time at intermediate fault positions and in situations where corrections or additions were required. Aside from this, the digital computer has the advantage of faster solutions, oftentimes with the use of subprofessional help.

C. F. Bannon and L. L. Gleason from Seattle City Light offered a paper covering the application and economics of pole-mounted capacitors to a primary network distribution system.

At the conclusion of the meeting, Bradley Cozzens, institute stalwart, suggested that computer programs of the type discussed by Lantz be made available to Western utilities through some sort of AIEE-sponsored library. There was a general feeling that this was a worthy suggestion and it was agreed to carry it further within the institute.

For d-c testing . . . a new machine

D-C Testing

Not a part of the official program, but a subject of great interest, was the presentation of Dr. Wouk, Beta Electronics, who discussed a new piece of equipment for high-voltage d-c testing. Using a technique set forth by Schleif, a Van de Graff generator-type d-c source enabled the user to separate charging current from leakage current without taking readings over a prolonged period of time. In addition, the equipment has excellent stability characteristics and the ability to increase or decrease in precise steps. A vigorous question and answer session proved that interest in this testing technique was high indeed.

Substations

A. A. Straub, presiding

The substation meeting was started by a report by AIEE working committee 54.2, covering fire protection and minimizing fire hazards in substations. The report was mainly based on the results of a questionnaire that contained an abundance of information about which future substation design would be based. The unquestioned highlight of this section was the paper presented by Eric Tugby of Southern California Edison Co. covering high voltage-high capacity interruption testing. The entire group gained a profound respect for the manner in which the tests were carried off technically as well as the spirit of cooperation that the Edison organization fostered with the manufacturers whose equipments were being tested. Aside from its original objective of determining the present-day capability of older equipment, the field testing procedures have served as an effective proving ground and a vehicle for the development of proved equipment for the whole industry.

A short series of films, covering actual tests, squashed any possible impression that Edison was testing "just for fun."

Relaying

M. A. Bostwick, presiding

During this session Portland GE's M. A. Bostwick made a strong appeal to industrial engineers and consulting engineers to put their heads together with the utility engineers so as to design protection equipment adequate to protect and free from needless power interruptions. Bostwick cited several examples where service was unreliable, which resulted from failure of consulting engineers to coordinate their designs with utility system protection engineers.

Paul Morse, G-E, discussed his brain child, the miniaturized a-c network analyzer, which will shortly become a marketed product.

Radio Communications

T. W. Stringfield, presiding

The center of utility communications interest was a paper presented by Emory Strong and E. J. Warchol, BPA, and S. E. Benson of the Philco Corp. The paper entitled "Micro-

wave Radio Communication Under Severe Winter Conditions on the BPA System" set forth the solutions to win snow and icing problems which, unless solved, would seriously affect the reliability of microwave systems in the Northwest. The paper covers the use of thermomicrodomes, which are electrically heated covers made up of glass fiber and polyester resinate. Considerable work went into developing resistance wire pattern to minimize signal attenuation from the antenna source.

Also covered in the paper were some applications of passive repeaters (billboards), including some extremely clever two-cushion shots at the Big Eddy reflector site.

Industrial Power Systems

R. A. Erwin and
W. Ferguson, presiding

Shell Oil Co.'s J. T. Brannan covered the electrical power requirements of an oil refinery in the Pacific Northwest. In his paper, he indicated the disproportionate losses that an oil refinery can suffer from moderate interruptions in electric power. He went on to indicate the costly but necessary precautions that must be taken to assure continuous power for the critical refinery loads.

Allis-Chalmers' D. Dalasta and S. R. Durand discussed the effect of high-speed breaker reclosing on industrial power systems. While high-speed reclosing can be more safely utilized to help small motors ride through system disturbances, larger equipments may not even be able to tolerate minor voltage dips. The paper includes methods of predicting system and motor behavior under fault conditions in utility and industrial power systems. The paper should be particularly helpful in industries where it is necessary to capitalize on the increased reliability and continuity that can be obtained from high-speed breaker reclosing.

Commenting on the power supply for the Hanford Atomic Plant, R. F. Haynes, G-E, pointed out the original design philosophy of the overall power supply is proved to be sound by evidenced by no complete loss of power of any reactor while in operation and, second, no lightning strikes on shielded transmission lines. As a companion paper, A. A. Maxwell covered fault testing on the power system of the Hanford plant, pointing out that the fault testing was well justified since the tests indicated weakness that could be detected and corrected or else serve to verify the anticipated system reliability.

Supply People Go to School

School for suppliers has started in Los Angeles. It is the first of a number of similar schools to be conducted throughout the nation as a result of the development of a program by the educational committee of the National Association of Electrical Distributors.

The course is one to teach "electrical supplies and equipment product and application" to distributor office and warehouse personnel and sales trainees. It has long been felt by distributors that the growing complexity of the electrical supply business needed more training which the individual distributor has had to supply, if any. In order to attract and hold trainees to supply the manpower needs of the industry it was felt quicker training and more comprehensive training was needed.

Cooperation of the Los Angeles Board of Education was obtained and the 37-week course is being taught at Los Angeles Trade-Technical Junior College under the sponsorship of the Southern Area NAED Western region. Kenneth Hartley of Electric Corp. is chairman of the education committee.

Classes meet Tuesday evenings from 6:30 to 9:30 p.m., having started Sept. 17. New students may enter at any time and make up previous work. Certificates will be given those completing the course. The instructor is Fred E. Cooper, consulting electrical engineer, who has had 14 years experience with Westinghouse. He will call on industry specialists to aid teaching special subjects. A registration fee of $3 is charged. NAED education committee has suggested that distributor employers of those taking the course set up bonuses of their own for those who complete the work.

The first class was quickly signed up and applications are still being made for future classes. Some 15 other cities have expressed a desire to undertake a similar program.

Electric Clubs

Phoenix, Ariz., is launching an electric club. In fact it has already held three preliminary meetings, each with a greater attendance. It is proposed that it will follow the pattern of other electric clubs, even with a constitution and bylaws similar to the Los Angeles Electric club. A committee has been selected to nominated a president, vice-president, secretary-treasurer, sergeant-at-arms and five executive committeemen who will be elected at the Oct. 9 meeting at Westward Ho Hotel. Jerry Whitnell, Arizona Public Service Co., has been acting as presiding officer; Les Waggoner, same company, secretary.

RMEL Convention

A day between business sessions just for tours and golf will make the program of the Rocky Mountain Electrical League somewhat different and, the program committee feels, bring greater concentration on the fine features of the program. A number of nationally prominent speakers are assured from the preliminary program announced by Guy W. Thomas, RMEL president, Public Service Co. of Colorado.

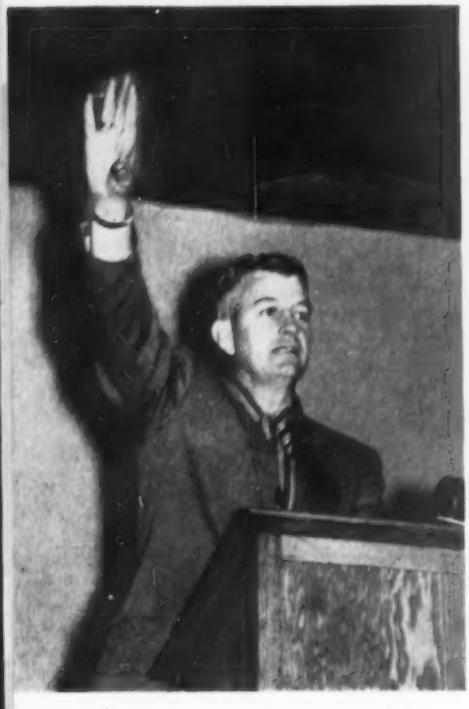
Edwin Vennard, managing director, EEI, will start the Monday, Oct. 14, session at the Broadmoor Hotel, Colorado Springs, with "America's Challenge." D. B. Hyer Jr., president, Southern Colorado Power Co., and Walter Lucking, president, Arizona Public Service Co, are also to address the opening session. Dr. Norman Royall, University of Kansas City, will address the luncheon.

That afternoon Glenn B. Warren, vice-president, General Electric Co., describes "Future Power Plant Design." E. M. Naughton, president, Utah Power & Light Co., concludes with "Current Events and Our Future."

On Wednesday, Oct. 16, R. T. Person, vice-president, Public Service Co. of Colorado, will open proceedings and H. H. Scaff, vice-president, Ebasco, will tell of "The Impact of Current Money Market Conditions on the Electric Utility Industry." R. J. Sargent, marketing and consumer products division, Westinghouse Electric Corp., will urge "Let's Put Full Power Behind Housepower."

The famous General Motors' lecturer, Dr. R. C. S. Young, University of Georgia, will address the luncheon. His subject: "Why I Am an American," is an inspirational one of great power.

The afternoon will hear of "Fission Finance and the Future," from J. W. McAfee, president, Union Electric Co., and vice-president, EEI. A favorite in the West, Kinsey M. Robinson, president, Washington Water Power Co., will conclude the business sessions with his recapitulation of the "Power Situation in the Pacific Northwest."



For Utah P & L's President Naughton a new title . . . . . Neenow Natusee

How! Montana Power's chief welcomes NELPA group, asks support for . . .

Uncle Sam's Forgotten Man

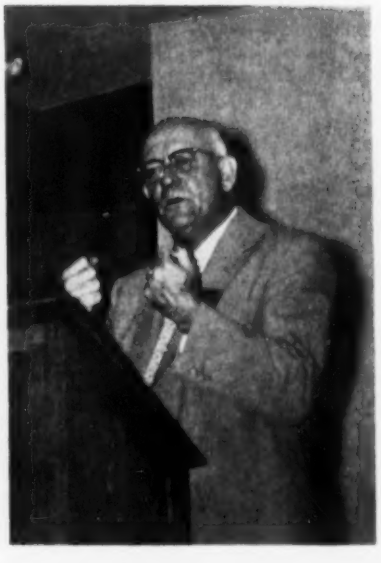
As Ed Naughton called the 50th annual meeting of the Northwest Electric Light & Power Assn. to order he brought to a close a year of vigorous activity — a year of definition and new purpose for the association. In this regard he cited the convention theme of Thinking Bigger—Planning Better as appropriate for 50 more years' growth.

Jack Corette, Montana Power's personable president, welcomed the group to the east Glacier resort (2.9 miles north of Dusty's) in Montana. He challenged the group to increase productivity and efficiency in the industry by means of intelligence, ingenuity, industry and leadership.

Uncle Sam's Forgotten Man

Corette dubbed the private utility customer as "Uncle Sam's forgotten man," a term worthy of industry-wide public relations efforts. He indicated his willingness for the industry to present the facts on the forgotten man's plight more courageously and that if necessary the industry should not back away from a toe to toe ideological scrap in protecting the rights of the forgotten man.

Turning to the subject of inflation, Corette pointed out that runaway inflation may force the utilities to pass rate increases on to their customers. When rate increases are necessary they have to be sold to the public as well as to regulating bodies, if the utility hopes to make the increase stick. Finally, he pointed out that as the cost of money increases it will be necessary for utilities to increase the rate of return to their shareholders. Concluding his warm welcome and challenge, Corette introduced John F. Childs, vice-president of the Irving Trust Co. and warm friend of the utility industry. Childs gave the group a financier's eye-view of the utility industry, lauding the industry for its job in holding prices down and for healthy diversified growth.



". . . pull together"
NELPA's new chief . . . John Kimball

Assessing the liabilities of the industry, Childs said that the nature of the utility business causes a certain amount of innate ill will on behalf of the customer who in some cases regards himself as a victim of the "octopus" utility company. Some of this feeling is a holdover from previous holding company financial practices, which no one today would attempt to condone. To further aggravate the customer relations situation he pointed to the tendency of the daily press to blatantly headline utility rate increases in terms of millions of dollars at the same time they cover increased prices of meat in terms of cents per pound. Childs' comments in conjunction with those of Corette would seem to justify additional attention in the coming months to customer relations as a hedge against the increasing probability of rate increases. Childs concluded: "Public relations efforts must be doubled and trebled both through employee training programs to make them ever better ambassadors for you, and at all levels of public relations—local, area and national, but with principal emphasis on the local."

Westinghouse Electric's M. B. Wyman talked about building greater customer use for tomorrow's economy. In a particularly lucid presentation he showed the group the basic forces behind industrial, commercial and residential growth. Having treated the demand side of the picture, he discussed briefly the developments in generation, atomic power transmission and distribution that will make it possible for the utilities to serve the expanded loads anticipated for tomorrow's economy.

E. O. George, vice-president, The Detroit Edison Co., challenged existing sales philosophies on the basis that, no matter how much effort has been expended in the past, electric utilities are getting a smaller share of the consumer dollar. He challenged the traditional approach of selective sales aimed at load balancing. He stated: "I submit that former marketing approaches are no longer appropriate, that a concern for the most profitable load must be compromised to the long-range objective of all-electric living and that the time to begin is yesterday!"

In carrying out his program of selling electric living as a way of life, he praised the start the industry has gotten under the Live Better . . . *Electrically* and Housepower programs. He pointed to market research, advertising, sales promotion and merchandising as four categories worthy of utility sales management's consideration. Looking at rates, George commented that, ideally, rates should be structured in such a way that is attractive for customers to use large quantities of electricity. He likened present-day energy sales to a farmer who would sell strawberries for 50c if you used them on shortcake and 60c if you used them on ice cream. He concluded with several ideas of ways in which his company was helping to further the theme of all-electric living.

New Officers Elected

In a general business session which followed, President Naughton reviewed for the group the energetic program which Al Krieg and the association have undertaken during 1957. Association officers for the coming year include John Kimball, Idaho Power Co., association president; Tom Ingledow, B. C. Electric, first vice-president; and George Brunzell, Washington Water Power Co., second vice-president.

EEI's KENNEDY . . . A Mouthful —neenow eenah ickana suee—meaning Chief Little Light

Industry Thinking

Banquet speaker William V. "Pat" O'Brien, General Electric Co. vice-president, placed some definitions on the convention theme of Thinking Bigger—Planning Better. He stated that because of the tremendous interdependence in the whole electric industry that thinking big meant thinking beyond our immediate problems to those of the industry, our communities and the entire economy. Thinking big, he stated, requires looking beyond competition for customer dollars outside of our industry. In covering plan-

NELPA's EXECUTIVE TEAM . . . Retiring President Naughton, Secretary Jean Faulkner, Managing Director Al Krieg and President Kimbal

G-E's O'Brien . . . "good men are hard to find . . . take care of them"

UTAH'S GADSBY . . . "for the atom . . . solve the technical problems first"

ning better, O'Brien pinpointed as an important area planning for tomorrow's utility leaders. He said, "Let me say that the best money that can be spent today by any company is in the proper remuneration of its young and promising employees. It has always been true that one good $10,000 a year man is more valuable to a company than two mediocre $5,000 a year men." (Standing ovation)

Almost everybody enjoyed Pat O'Brien's address.

Nuclear Energy

George Gadsby, venerable chairman of the board, Utah Power & Light Co., covered the present-day status of nuclear energy in the utility industry. Gadsby's carefully prepared paper drew from many leaders in the atomic energy field and left the group with the feeling that while economical atomic energy was not knocking at our door today that much was being done to bring it about in an orderly manner and that within a reasonable developmental period this energy source would be competitive in some areas of the country. He stated: "We must conclude that this is no time to rush ahead blindly, spending either investors' or taxpayers' money on reactors whose successful – to say nothing of economical – operation is still beclouded by technical problems as yet in the investigatory and developmental phase."

Earl R. Sample covered some of the technical aspects involved in planning for tomorrow's customer utilization. Sample appealed to utility planners to keep an open mind toward changing past practices. He pointed to a specific situation wherein a "radical" change in conductor size was adopted by his company in 1955, only to be judged "old-fashioned" and replaced by a still more radical plan in recent weeks. Equally important is the building of facilities that can grow easily.

A third suggestion was to review practices from time to time to see if they are still performing as expected.

Chiefs and Indians

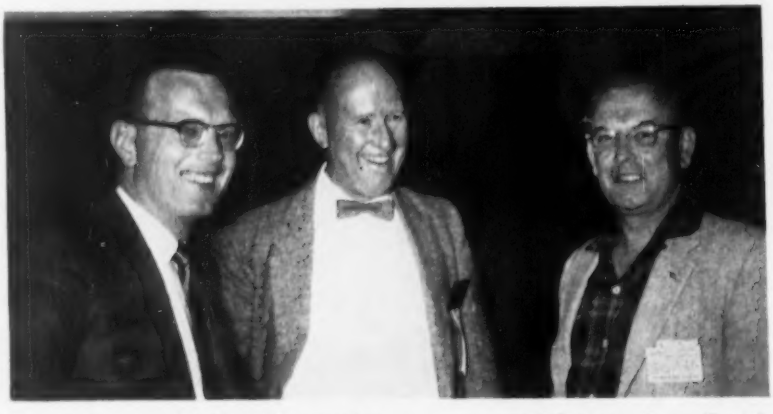
John Kimball, newly appointed NELPA chief, took the stand and ably evaluated the fine presentations given throughout the meeting. He built his original thoughts around the simple premise that utility management's No. 1 job was to find people—to train people—and to manage people. In the "find people" department he offered the suggestion: "Look outside your office door." He mentioned as a shortcoming of many managements the desire to bring in the capable man from the outside when such people were not to be found except within the organization. Turning to training, he indicated the wisdom of giving young people as much responsibility as possible. Referring to an early boss, Kimball stated that it was his policy to give a young man such a big job that he didn't have sense enough to know that he couldn't do it.

In the area of managing, he suggested that management's process of following a job to conclusion should be done in such a way as to motivate and compel others to do a better job. Such is the measure of NELPA's new chief.

Saving a large measure of the best for the last, EEI's President D. S. Kennedy was scheduled to discuss meeting tomorrow's manpower needs at the final luncheon. Taking honest recognition of the fact that many young people are prejudiced against the utility industry as a place of employment, he said: "our principal duty, therefore, it seems to me, is to impress the budding engineer with the many possibilities in the electric utility industry." He ended his enjoyable talk with some ideas regarding industry's responsibility in helping the schools solve some of their local problems, thereby bringing forth a crop of more capable young people.

The convention ended with many newcomers enchanted with the beauties of Montana's Glacier Park and with all looking forward to a promising 51st year for NELPA.

EEI's Kennedy Utah's Naughton Montana's Corette Irving Trust's Childs



Convention portrait: shop talk, meetings . . . . . and later a trip to Dusty's

HOW WESTINGHOUSE HELPS HARNESS A RUNAWAY DESERT BOOM

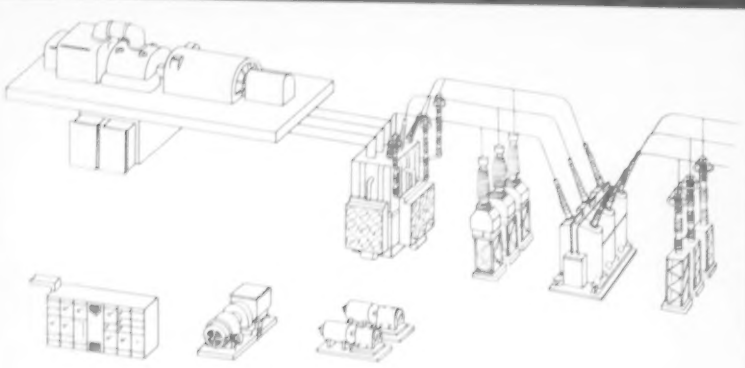
"Runaway desert boom" are the words of a feature writer for the Albuquerque Tribune, as he described the industrial expansion that has abruptly doubled the city's population and multiplied its appetite for electric power four times.

How Public Service Company of New Mexico expanded Person Station to handle this upsurge, and the Westinghouse equipment they used, is unfolded on the following pages.

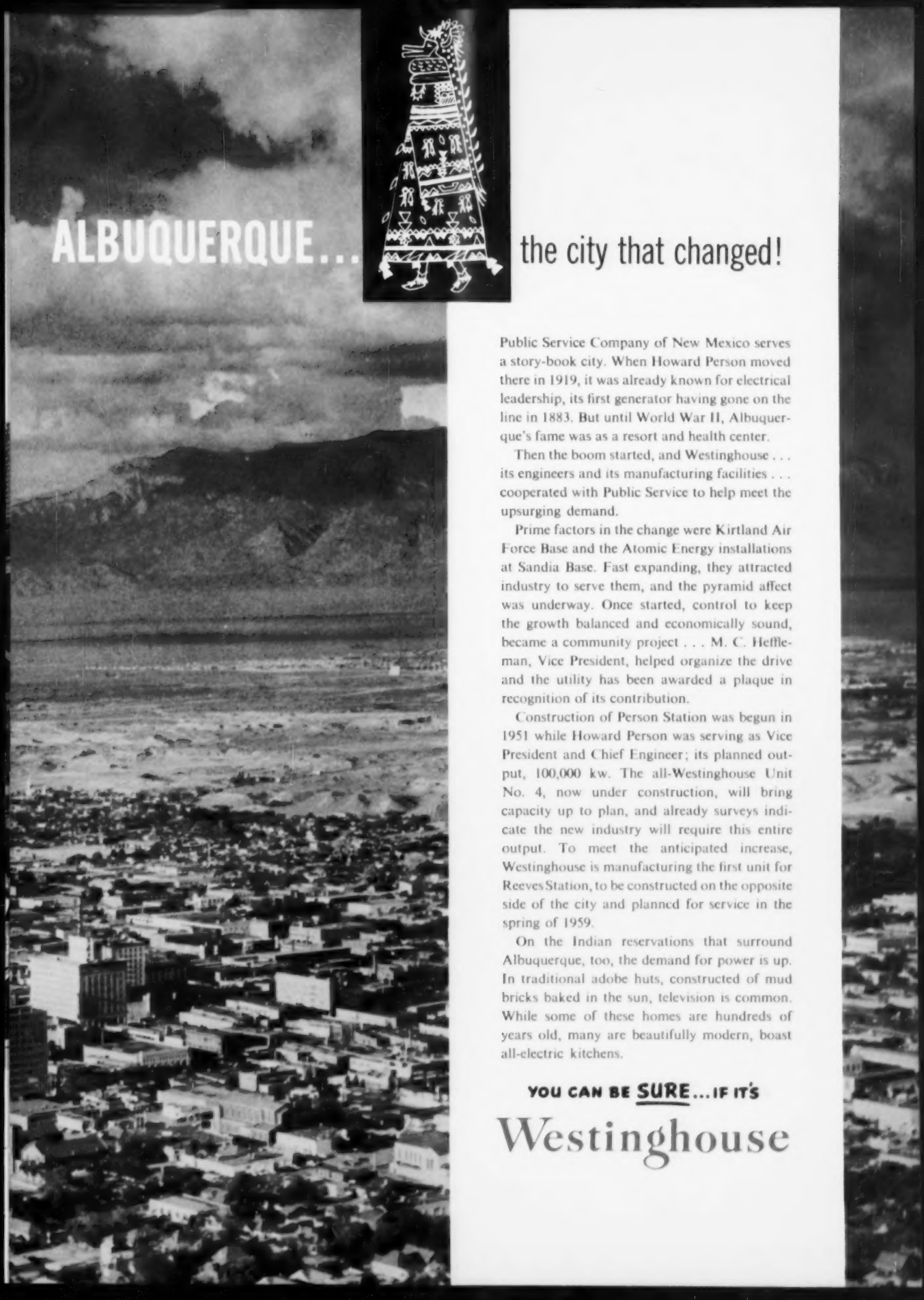
YOU CAN BE SURE...IF IT'S Westinghouse

Howard Person (far right) Consultant to Public Service Company of New Mexico. With him is D. H. Pollard of Westinghouse.

WESTINGHOUSE EQUIPS PERSON UNITS 3 & 4 TO POWER-UP



Indians on the reservations "Live Better Electrically." Above diagram shows the array of Westinghouse coordinated equipment being installed in Person Station Unit No. 4. Stearns-Roger are the Consulting Engineers and Constructors.



ALBUQUERQUE... the city that changed!

Public Service Company of New Mexico serves a story-book city. When Howard Person moved there in 1919, it was already known for electrical leadership, its first generator having gone on the line in 1883. But until World War II, Albuquerque's fame was as a resort and health center.

Then the boom started, and Westinghouse . . . its engineers and its manufacturing facilities . . . cooperated with Public Service to help meet the upsurging demand.

Prime factors in the change were Kirtland Air Force Base and the Atomic Energy installations at Sandia Base. Fast expanding, they attracted industry to serve them, and the pyramid affect was underway. Once started, control to keep the growth balanced and economically sound, became a community project . . . M. C. Hefflеman, Vice President, helped organize the drive and the utility has been awarded a plaque in recognition of its contribution.

Construction of Person Station was begun in 1951 while Howard Person was serving as Vice President and Chief Engineer; its planned output, 100,000 kw. The all-Westinghouse Unit No. 4, now under construction, will bring capacity up to plan, and already surveys indicate the new industry will require this entire output. To meet the anticipated increase, Westinghouse is manufacturing the first unit for Reeves Station, to be constructed on the opposite side of the city and planned for service in the spring of 1959.

On the Indian reservations that surround Albuquerque, too, the demand for power is up. In traditional adobe huts, constructed of mud bricks baked in the sun, television is common. While some of these homes are hundreds of years old, many are beautifully modern, boast all-electric kitchens.

YOU CAN BE **SURE**... IF IT'S

Westinghouse

HEAT, WIND AND SAND...**WESTINGHOUSE** TURBINE GENERATORS

Out in the arid desert, where cloudless sunlit skies are the year-round rule, outdoor construction might seem ideal for a generating station. But the desert brings a problem all its own . . . sand. Sand and dust, whipped by winds off the nearby mountain range, almost defeat the economy offered by outdoor construction. Almost . . . but not quite.

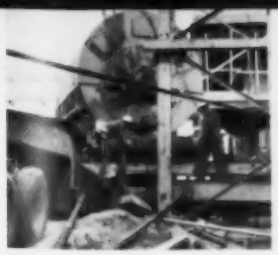
Basically, Person Station follows outdoor principles. Boilers, gas-fired with oil as standby, are outdoor. The building itself houses pumps, condensers and most auxiliary equipment, with turbine-generators on the roof. To protect turbine-generators during open periods for inspection and maintenance, Person Station has weather resistant enclosures over the Turbine Generator Unit. With removable hatches for easy crane access, these enclosures can be pressurized to keep them free from the hazard of unpredictable dust storms while machines are open for work.

In the generators, Thermalastic®, the exclusive Westinghouse insulation, retains its elasticity and insulating qualities over the complete range of operating temperatures.

PROVE THEY CAN TAKE IT

Turbine-generator Unit No. 3 at Person Station is a Westinghouse 30,000 kw ASME-AIEE Preferred Design; Unit No. 4 will be a duplicate. Precise factory balancing of turbine and generator rotors—under actual operating speed and temperature conditions, minimizes field balancing, and speeds installation.

Max Niese, Mechanical Engineer, Public Service Company of New Mexico, is shown discussing the lifting technique with Brakey Wallace, Superintendent of Construction for Stearns-Roger. Helping substantially in setting the erection record was the fact that the generator for Unit No. 4 was received completely assembled, ready for placing on the foundation.

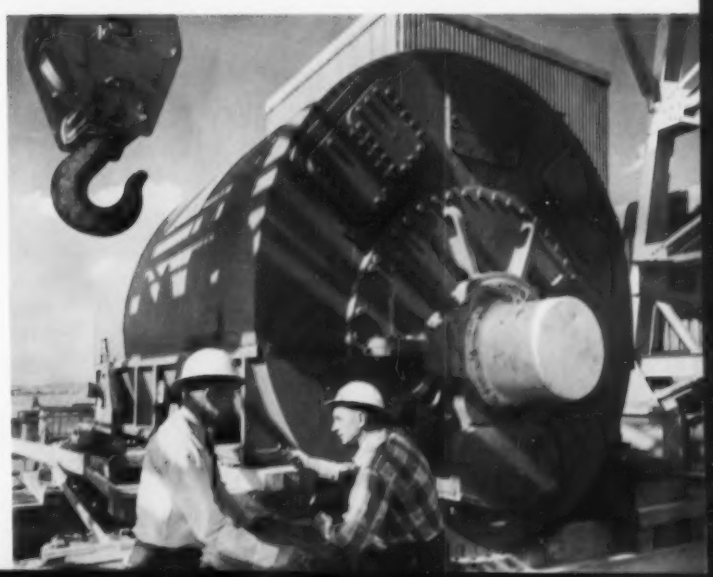


INGENUITY BOOSTS LIGHT WEIGHT GENERATOR INTO POSITION IN 15½ HOURS

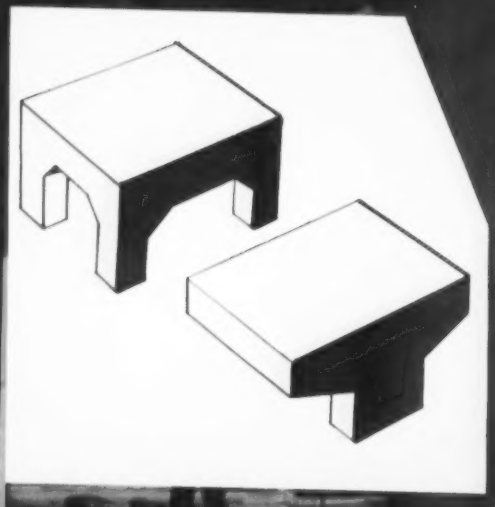
Normal time for standard cribbing techniques to move a 30,000 kw generator on to the foundation, according to the Construction Superintendent of Stearns-Roger, (Consulting Engineers and constructors), could run as much as two weeks, dependent upon conditions.

But here's how imaginative engineering shortened the job to just 15½ hours. When the 8:00 a. m. shift hooked on to Person Station's No. 4 generator last March 13, they moved it to a specially prepared elevating rig. By running it up the full reach of four jacks, then bolting it to the frame, reducing the jacks and bolting them up, reach by reach, the 95-ton generator was in position by 11:30 p.m., before a third-shift call was necessary.

YOU CAN BE SURE... IF IT'S Westinghouse



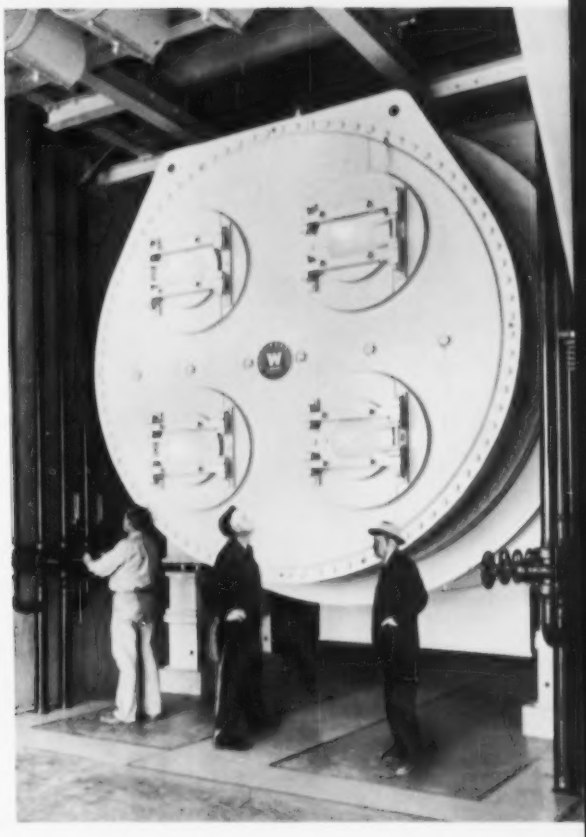
NEW FOUNDATION DESIGN CUTS COST OF TURBINE-GENERATOR INSTALLATION



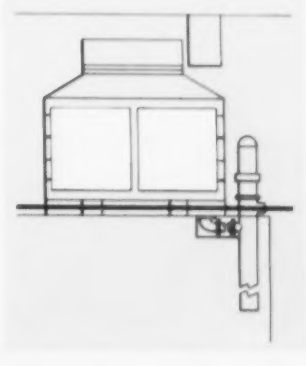
First worked out by Stearns-Roger in collaboration with Howard Person, a totally new "T" foundation was developed for the turbine-generators in Person Station. Replacing the conventional four or six pedestals of most turbine foundations with two broadlegged "T's", these foundations offered substantial savings in forms as well as in the volume of reinforced concrete required. Having proved successful in the 20,000 kw units installed first, this type of foundation has now been applied to the 30,000 kw units. Lighter weight and vibration-free characteristics of Westinghouse turbine-generators made this arrangement feasible.

YOU CAN BE SURE... IF IT'S

Westinghouse

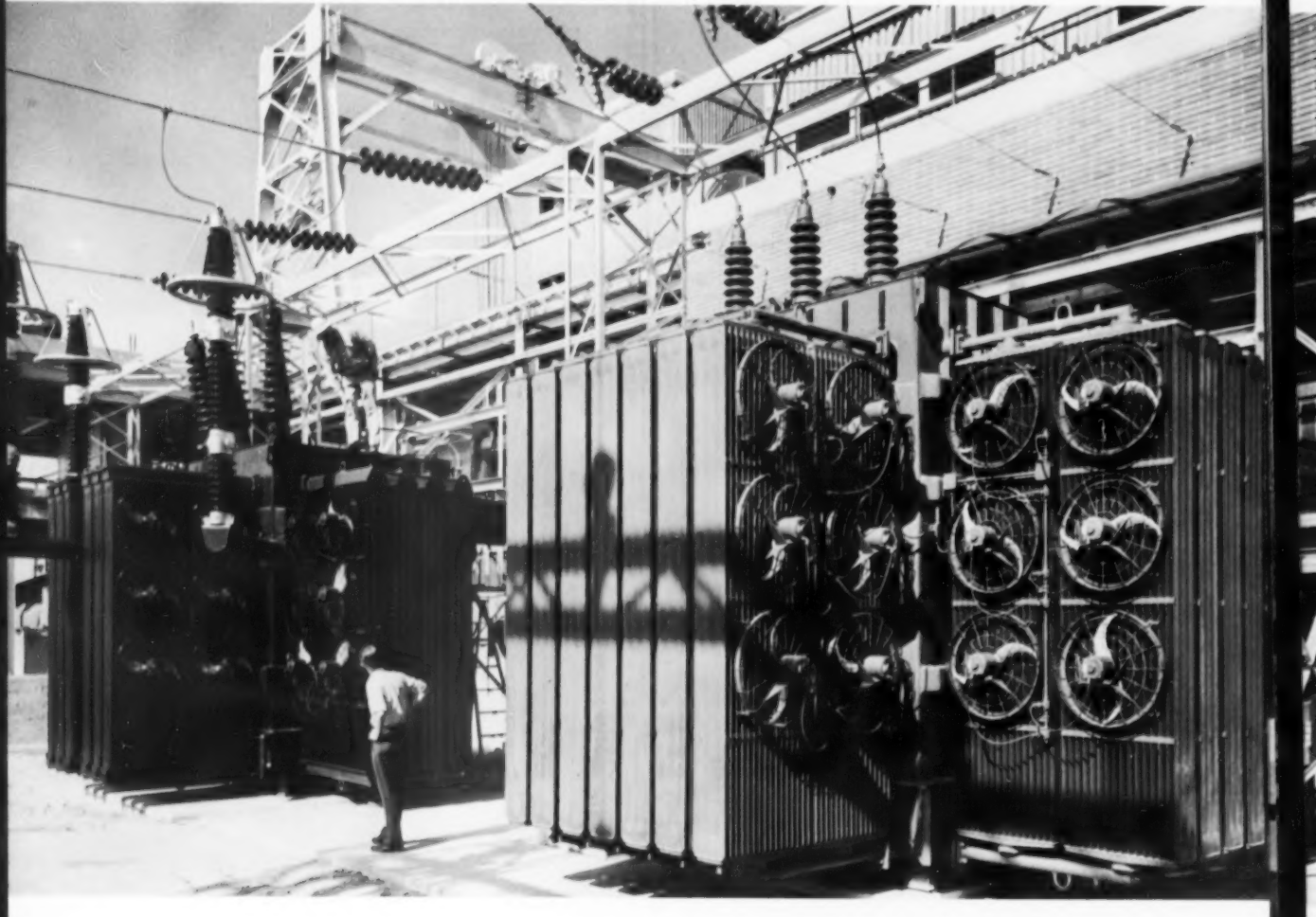


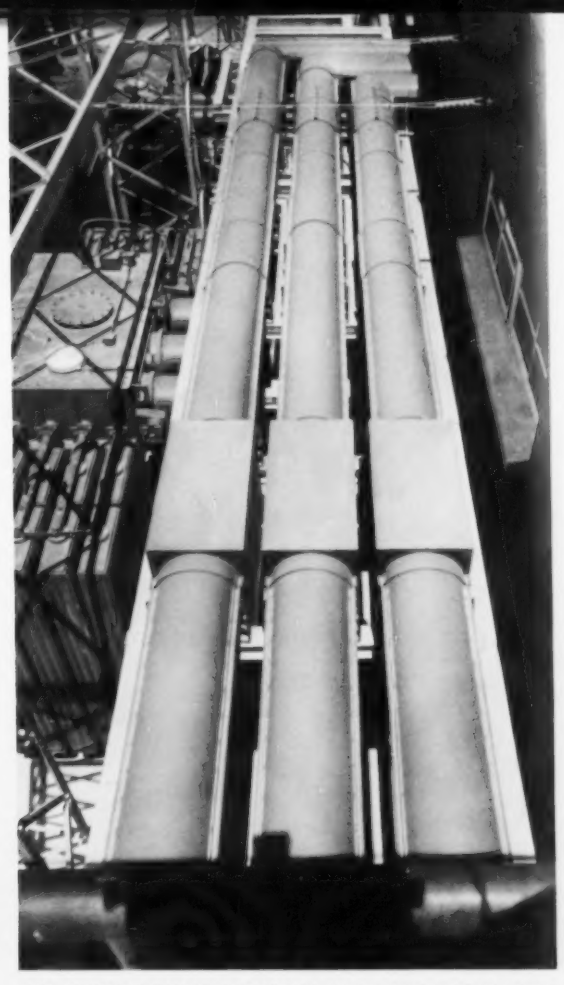
Garland Ratcliff (left) Westinghouse Erection Engineer assigned to the building of Person Station, checks over No. 3 condenser with H. H. Finch, Superintendent of Plants, Public Service Company of New Mexico. In the background, Marvin Branson takes a temperature reading on the hydrogen coolers. The condenser for Reeves Station, now under construction, will be of the newer Westinghouse rectangular design which offers a number of advantages for fast installation. In addition, with its two compartment radial-flow design and consequent short steam path to center air offtakes, the Westinghouse rectangular condenser provides lowest pressure drop.

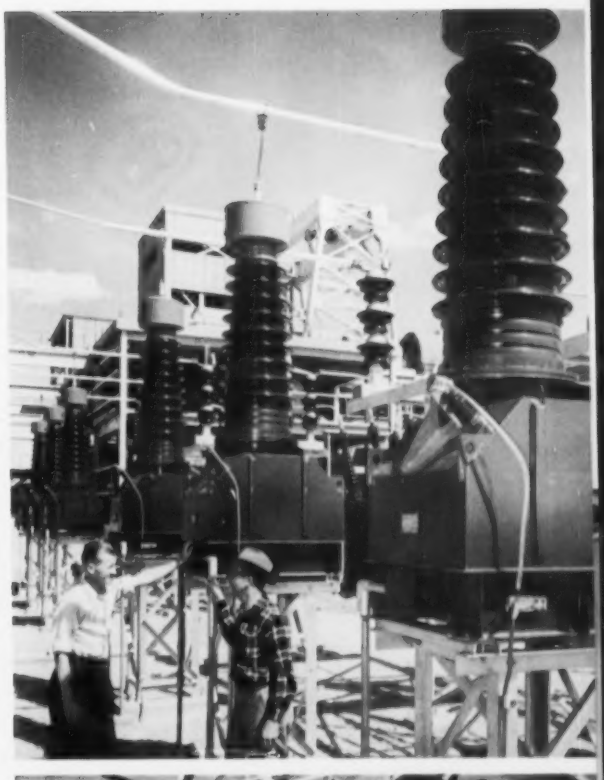


ALL WESTINGHOUSE SWITCHYARD...MAXIMUM PROTECTION FOR PERSON STATION 115 KV CIRCUITS

ALL FOUR POWER TRANSFORMERS at Person Station are Westinghouse Form-Fit® design. Transformers No. 1 and No. 2 are OA/FA, 25,000/33,333 and serving 43,800-volt transmission. Numbers 3 and 4 are OA/FA 33,000/44,000 kva to serve 115,000 volt transmission. They are protected with the new "condensed" Westinghouse arresters with the exclusive pressure relief device. Westinghouse Form-Fit transformer design not only offers appreciable savings in space and weight, but also the all-welded tank design is ideal protection in the battle with sand and dust.





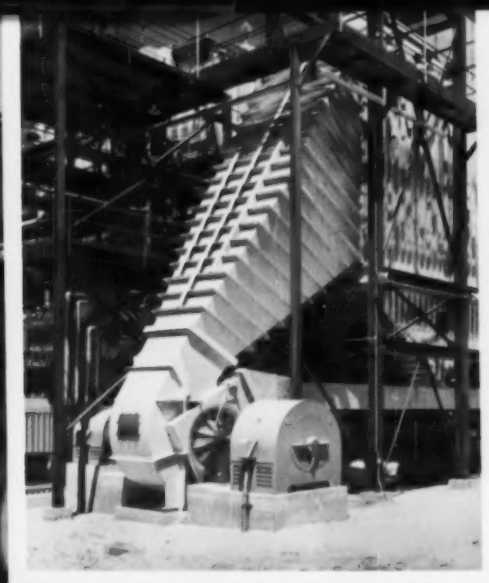


FOR COMPLETE MECHANICAL AND ELECTRICAL PROTECTION, Westinghouse isolated phase bus was selected by Public Service Company of New Mexico to provide a safe, reliable connection between generators and transformers. The complete and individual metal enclosure of all conductors and supporting insulators provides the highest degree of mechanical and electrical protection, insuring complete safety to operating personnel—eliminating maintenance by the use of dust-tight construction.

JOHN HAYS, SUPERINTENDENT of Person Station (above, right) is shown in the switchyard with Guy Schell, Foreman of Electrical Maintenance, discussing the standard Westinghouse potential transformers for metering and relaying on the 115-kv transmission circuits. The "Coastal Finish" applied to these units is a distinct advantage, to withstand not only the blistering sun and grating sand, but also extremes of weather. Below, Walter Dolde, Chief Electrical Engineer, and Merrill Harkness, Senior Electrical Engineer, are shown with the Westinghouse SV station arresters in the background.

YOU CAN BE SURE...IF IT'S Westinghouse

Westinghouse



(Top Left)
30,000 GALLONS OF WATER PER MINUTE are moved from cooling towers to condensers by two Westinghouse centrifugal circulating pumps. They are driven by Westinghouse Powerhouse Motors each rated 350 hp. In addition to the rigorous tests these motors undergo during manufacture to establish their reliability, all Westinghouse Powerhouse Motors are Thermalastic® insulated, for maximum protection in dust-laden atmosphere.

(Top Right)
ONLY FORCED DRAFT FANS ARE REQUIRED, since the boilers at Person Station are fired by gas under pressure. These are Sturtevant® Turbovane® Fans with the exclusive air-foil blade design which has up to 92% mechanical efficiency. These fans are driven by two Westinghouse Weather Protected Powerhouse Motors in tandem, rated 800 hp. and 350 hp.

(Above)
NO. 4 UNIT SUBSTATION . . . this bank of Westinghouse instruments and relays provides the intelligence and protection needed for efficient operation of the utility system. Recording instruments give permanent records of conditions on all lines served by this station. Directional overload protective relays quickly spot and isolate phase and ground faults . . . to provide maximum insurance against equipment damage. The transformer is Westinghouse Inerteen®, OA, 3-phase SL, 2500-kva.

DON POLLARD OF WESTINGHOUSE discusses the new Westinghouse Type GM-5-A power breakers with Guy Schell, Foreman of Electrical Maintenance at Person Station. Pollard is pointing out the advantages of the pneumatic mechanism, both mechanically and electrically trip-free, which gives high speed operation with low control energy. The reliability of this type of mechanism has been proven in over 15 years of field service.

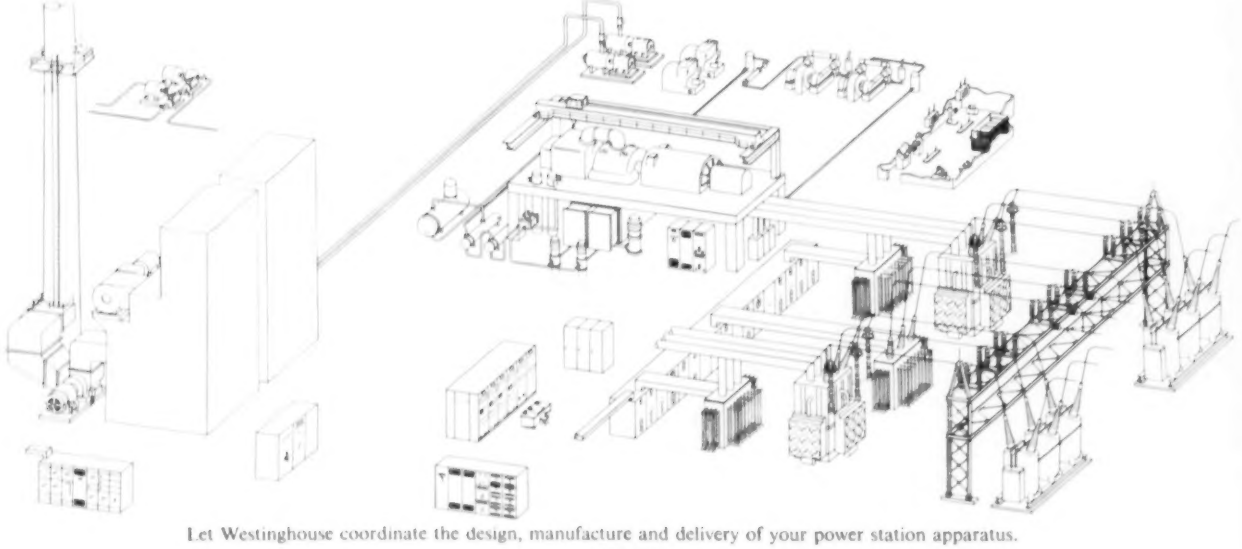
YOU CAN BE SURE...IF IT'S Westinghouse

PERSON STATION... focal point of the Public Service system

The newest and most advanced station, Person Station houses the supervisory control for the entire system. Mervin Lattin, System Operator, is shown at the illuminated system diagram. Lights on this board are a constant reminder to the operator, showing position of all breakers and switches as well as operation of generators. No work crew moves onto any portion of the system without advising him what indication should be shown.

This is an account of how one utility met the challenge of progress and its load demands . . . and how Westinghouse cooperated with engineering, experience and equipment. Your Westinghouse representative can bring you similar assistance. The wide variety of coordinated equipment he is prepared to supply is diagrammed below. Call him for the most complete service available in the industry.

CP-1044



Let Westinghouse coordinate the design, manufacture and delivery of your power station apparatus.

YOU CAN BE SURE... IF IT'S Westinghouse

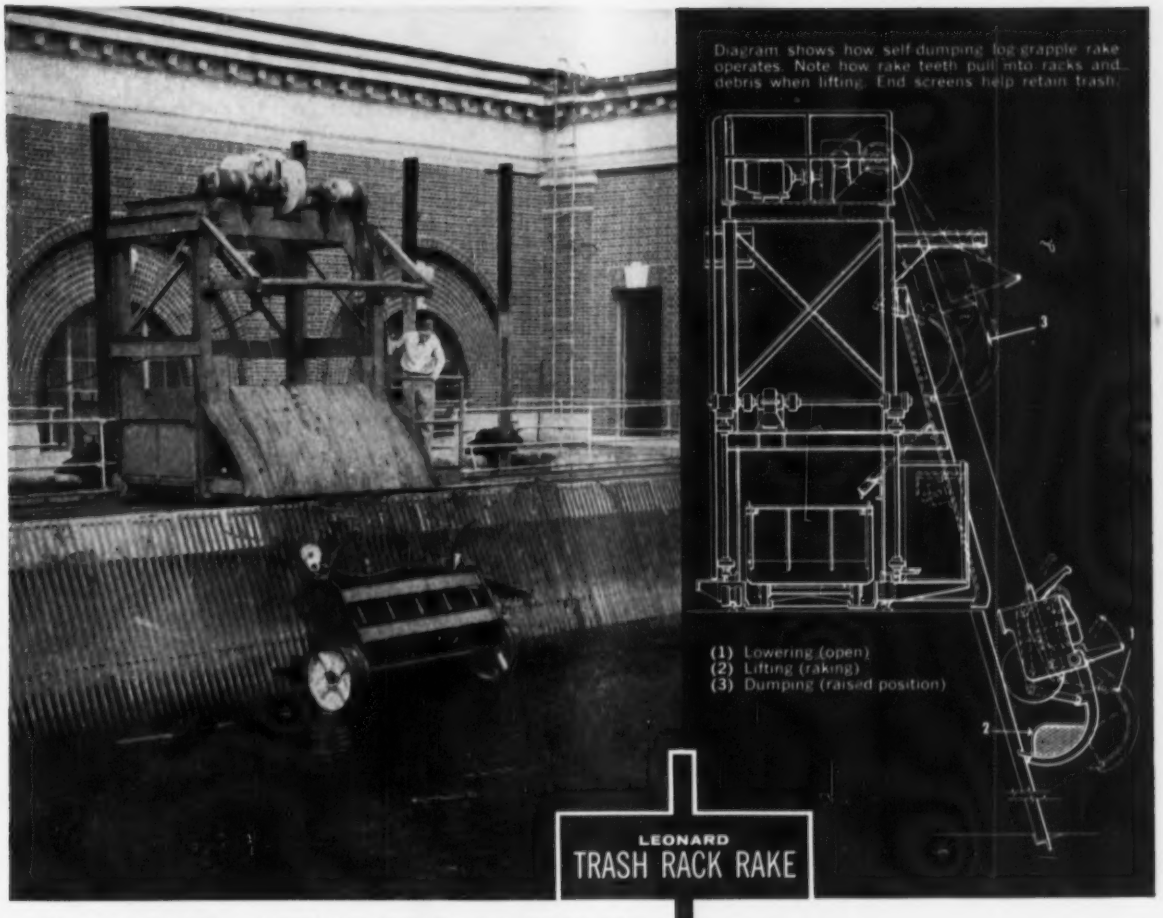


Diagram shows how self-dumping log-grapple rake operates. Note how rake teeth pull into racks and debris when lifting. End screens help retain trash.
(1) Lowering (open)
(2) Lifting (raking)
(3) Dumping (raised position)
LEONARD
TRASH RACK RAKE

New 8-foot, self-dumping SMS rake at Niagara Mohawk Power Corporation's Black River Station is one of five recently installed by this company.

Two New Self-Dumping SMS Trash Rake Designs CUT CLEANING TIME AND LABOR

Now SMS offers you two improved Leonard trash rack rakes, both regular and log-grapple types. These self-dumping rake designs make operation easier and quicker, permit you to clean a greater area faster. Both new rake types are now available as additions to the SMS line of standard rake designs.

SMS Leonard rakes operate directly on trash rack bars . . . ride down over stubborn obstructions and work them loose. Such freedom of movement assures fast, easy cleaning. Initial costs are low because the width of SMS rakes can be kept to the minimum required for handling for trash and the expense of guides attached to racks, or embedded in piers is eliminated. These rakes are of simple and rugged construction, designed for outdoor service and require minimum maintenance.

For full information on trash rakes and other SMS accessories, write to S. Morgan Smith Co., York, Penna. Request Bulletin 158 on Leonard rakes, or Bulletin 158A on new, self-dumping rakes.

S. MORGAN SMITH HYDRODYNAMICS

AFFILIATE: S. MORGAN SMITH, CANADA, LIMITED, TORONTO

Rotovalves • Ball Valves • R-S Butterfly Valves • Free-Discharge Valves • Liquid Heaters • Pumps • Hydraulic Turbines & Accessories

How's this for flexibility?

Design for the future NOW with Tiger Brand Armorlokt

BETTER THAN WORDS, the big picture shows the complete flexibility of Tiger Brand Armorlokt when installed in an open rack system. New cables can be added easily *any time* when your electrical load increases . . . as it surely will in the years to come.

Remember the splicing advantages of this cable, too. It's not likely, but if Armorlokt is damaged by a crane or some other object, you simply insert a splice box. Compare this to cable in rigid conduit; if it's damaged, you have to pull the entire cable out (if you can *get* it out) and start all over.

If you want to look to the future while designing today, think seriously about Tiger Brand Armorlokt for new construction or modernization. It is made in a complete range of sizes and constructions. Just ask your AS&W salesman.

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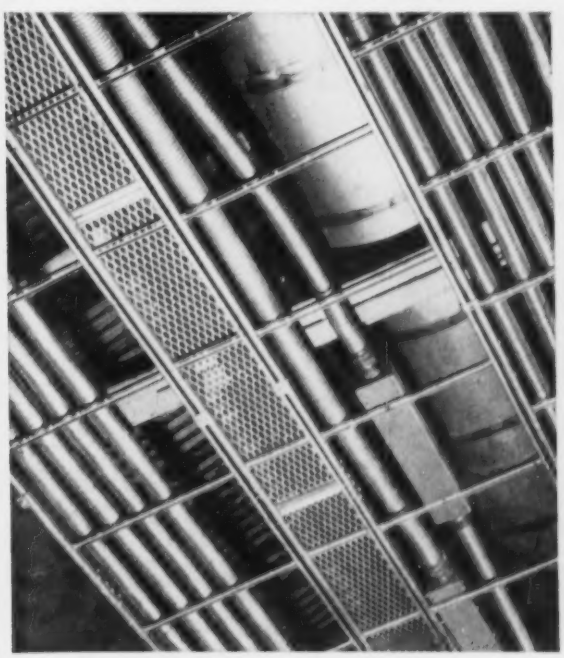
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors

Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, New York

Flexible Armoriokt eliminates strain at boxes.



Splices can be made anywhere along cable.

Watch the **United States Steel Hour** on TV every other Wednesday (10 p.m. Eastern time).

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- ASBESTOS WIRE AND CABLE
- MOLD CURED PORTABLE CORD
- SHOVEL & DREDGE CABLE
- PAPER & LEAD CABLE
- VARNISHED CAMBRIC CABLE
- INTERLOCKED ARMOR CABLE
- SPECIAL PURPOSE WIRE & CABLE
- AERIAL, UNDERGROUND AND SUBMARINE CABLE

USS TRADEMARK

UNITED STATES STEEL

The Hotel Coronado convention hall was the scene of the dramatic presentation "Roll Out Your Life," an historic review of the significant happenings that have occurred in one generation of distributor management. The skit honored senior members who have steered NAED activities successfully through years of varied problems

NAED Continues Self-Appraisal

Members of the convention committee included (left to right) E. C. Phillips of Coast Electric Co., San Diego; J. K. Parsons of Glacier State Electric Supply Co., Great Falls, Mont.; Stanley M. Johns, The Electric Corp. of California, Los Angeles; and Sam Mesick of the Los Angeles Wholesale Electric Co., Los Angeles, who is the retiring regional vice-president of the association

Electrical distributors from the 11 Western states, meeting at Coronado last month, took a long hard look at their business functions—and the problems which beset the middle man in today's economy. Phrases such as "contract fever," "the ability to walk away from an order," and "the value-added concept" were heard frequently both from the platform and in the less formal conversations that are a part of every convention.

Sam Mesick, Western regional vice-president, reported to the members on the area activities of NAED. In discussing some of the problems confronting the distributor, Mesick pointed out that ethics and honesty were commodities and should be dealt with as such. He also urged that company organization policies be studied with a view to building people and educating distributor personnel on the basic functions of the distribution process. An interesting sidelight on the latter, he reported, is the new training class for distributor personnel that was

H. S. "Skip" Warren of Rome Cable with Mr. and Mrs. Leonard Shelly of Federal Pacific, San Francisco

started in Los Angeles last month with a full registration.

The contractor's viewpoint on electrical industry coordination was presented by Paul M. Geary, executive vice-president of the National Electrical Contractors Assn. Geary pointed out that the contractor also was a member of the distribution team necessary to serve the ultimate customer and that the contractor, in essence, performs the retail distribution function for the electrical supply segment of the industry. One of the best ways to improve the basic relations between the contractor and the distributor, according to him, is to determine which of the over-all distribution functions are to be carried out by each party. Such functions as selling, financing, engineering, estimating and others could be more clearly delineated to the benefit of everyone, including the ultimate user.

In discussing the values of association work, he pointed out that the problem of small business is to obtain competent management services such as marketing, labor relations, public relations and typical training. Association activities are one way of bringing these services within reach of the small business man economically.

Effective Distribution

Sylvania's Garlan Morse, who was recently transferred from the West Coast to Salem, Mass., as general sales manager of that company's lighting division, told the group that existing distribution methods are constantly being changed and that management must be alert to new innovations and practices to

From Rhode Island to Hawaii: Ken MacLean of the Carol Cable Co., Pawtucket, talks with Mr. and Mrs. A. J. Vivas Jr. of the National Electric Supply Co., Honolulu

keep its company competitive. He told the group that competition was not going to slacken and he outlined four key factors that require the unrelenting attention of top executives if the company is to prosper.

These four major elements are (1) good control of assets, (2) effective purchasing, (3) up-to-date

This vivacious group at the manufacturers' cocktail party includes (left to right) Karl Kempf of Thomas & Betts Co., Los Angeles; Mrs. Fred Goss; W. K. Dunbar Jr. of Phelps Dodge, Los Angeles; Mrs. Kempf and Fred Goss, dean of the San Diego distributors

W. D. Meek (left) of Wesco, Los Angeles, chats with Arthur Hooper, NAED's executive director, and W. M. Jewell of the NAED staff, San Francisco

operations and (4) progressive selling. These items are interrelated. For example, the number of lines carried has a direct bearing on the control of assets. Similarly, credit policies may be tied into selling.

Morse also pointed out that a distributing operation can either be one that specializes in a few high-quality lines with good selling and service or a strictly jobbing operation which capitalizes on low price and fast turnover. He suggested that it is most difficult, if not impossible, to try to operate both ways because the fiscal and management policies for each operation are widely divergent. Profit improvement is the ultimate objective of any company and all processes and policies should be frequently reappraised to insure each phase of the business is yielding a reasonable return on its operation.

Arthur Hooper, NAED's executive director, warned the convention that the distributor is at the crossroads and has to choose between becoming a full-fledged part of the electrical industry growth or being content to be a poor country cousin. He called for recognition of the value of the full-functioning distributor and for distributor leadership to eliminate what he termed to be the three "Cs" of the business jungle; i.e., cut price, confusion and chiseling.

Hooper urged that manufacturers improve their policies to help the distributors function more effectively in improving service to the ultimate customer. He cited the refusal to recognize the cost of services of the distributor, the refusal to recognize that a wholesaler can't be a part-time supplier for the manufacturer and the lack of recognition given to firms who are committed to contributing to industry advancement as some of the more important factors which need correction.

The last session of the convention was devoted to discussions of distributor problems and association activities, including an appraisal of the antitrust laws as they affect business operations in the wholesaling area. Elected to succeed Sam Mesick as regional vice-president was Ralph W. Rohrbach of the Pacific Wholesale Electric Co. of San Diego. New members of the board of governors of NAED are Hal F. Boeger of State Electric Supply, Oakland, and C. O. Armstrong of the Argo Electric Supply Co., Huntington Park, Calif.

The excellent address on the modern concept of distribution, presented by Ken Rehwaldt of the G-E Supply Co. of Los Angeles, is reported in full on page 95.

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When anchor users make a study of earth anchors—make their own pull tests for holding power—make their own comparisions . . . we're happy, because the Chance 8-Way almost always takes top position for holding power and ease of installation.

Such tests prove that the 8-Way holds far more than its rated load because its *eight* blades expand to form a complete pyramid shaped square—there is no wasted space between blades. The guy load is distributed to all *eight* blades all the way around the hole.

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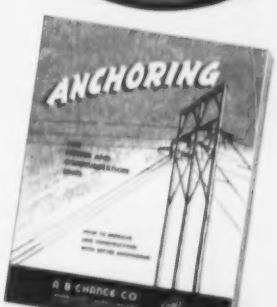

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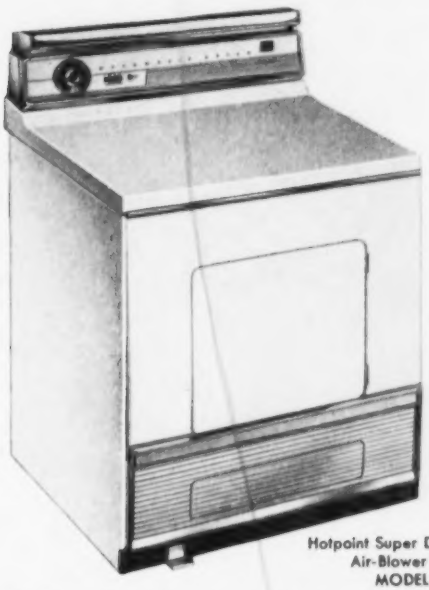
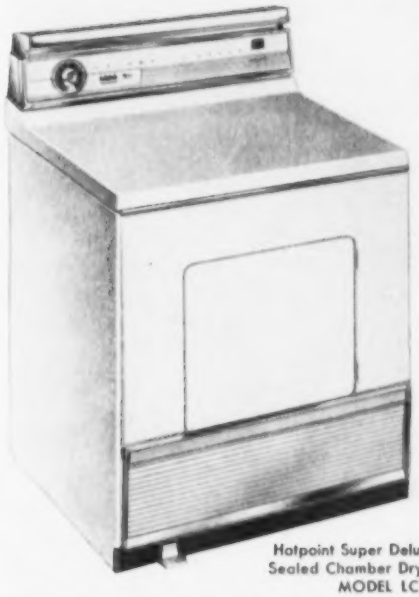
NEW QUARTERS—Taken at the grand opening of a $325,000 building in Honolulu, this picture shows only a section of the new quarters of Ramsay appliance department of American Factors—the 10,000-sq-ft selling area on Beretania St. Other features in the new building are a kitchen auditorium on the second floor, with seating capacity of 150 and a 75-car parking lot with fluorescent floodlights and frontage on two streets. The lava rock foundation and orchid display are particularly effective when the building is lighted at night. The move from the old quarters on Kapiolani Blvd. and South St. to the Beretania and Pensacola St. location was under direction of W. L. Doering, Amfac vice-president, and George Rinker, Ramsay manager. The new Ramsay store is part of a big capital expenditure program in Amfac wholesale division to include also a 55,000-sq-ft, $275,000 warehouse for the steel and plumbing inventory of the company

SALES JOB ON LIGHTING—The Home Lighting Workshop, sponsored jointly by Arizona Public Service Co. and Arizona State College at Tempe, was primarily an educational effort. However, the fact that it enrolled 60 educators, instructors, designers and others interested in lighting will give impetus to the utility's promotions in the months ahead, Byron Payne, division residential sales supervisor, is convinced. Sessions on interior and exterior home lighting were included in the five-day seminar, for which Arizona State College offered one hour's credit. Shown here is Myrtle Fahsbender of Westinghouse (second from left), leading speaker, with Audie E. Ashcraft, Southern California Edison; Dr. Jessie M. Rannels, Arizona State College; Jackson B. Hacker, San Diego Gas & Electric; Byron Payne, Arizona Public Service. Dr. Rannels and Payne were co-chairmen of the workshop session

KITCHEN IS WINNER—At the California State Fair, Sacramento Municipal Utility District was awarded a plaque and first-place blue ribbon for the most outstanding exhibit in the commercial division—RCA-Whirlpool's Miracle Kitchen. Leo J. Meyberg Co., distributor, collaborated with SMUD in getting the exhibit for the fair. Carl L. Richey, sales administration officer, and George L. Cane, manager of sales development, received the award for the utility. Designed to be practical as well as eye-appealing, the kitchen features such automatic devices as a remote controlled mobile floor cleaner (which scrubs, waxes and polishes); a self-propelled serving cart; electronic oven; etc. Peggy Smith of RCA-Whirlpool in kitchen



Hotpoint Super Deluxe
Air-Blower Dryer
MODEL LB45



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Automatic Electric Dryers for '58!

Hotpoint offers a complete selection of Automatic Electric Dryers to help you put more of these revenue-producing appliances on your lines. The 1958 Hotpoint Line includes two types, six models. There's one for every need, every budget—each with distinctive new Hotpoint CLEAN-LINE Styling, and loaded with the super sales-appeal that only Hotpoint advanced features can create!

Your Hotpoint Distributor has complete details on Hotpoint's aggressive merchandising support, feature versatility and presold popularity. Ask him to show you how easy it is to build profitable load—and to develop *sustained* revenue—with Hotpoint Automatic Electric Dryers! They will help you put more POWER in "Housepower"—more LIVING in "Live Better . . . Electrically!"

4 **Hotpoint Air-Blower Dryers** . . . with plug-in flexibility! One connection for either 115V or 230V operation. Air-Blower models have giant Wide-Screen Lint Filter for increased drying efficiency.

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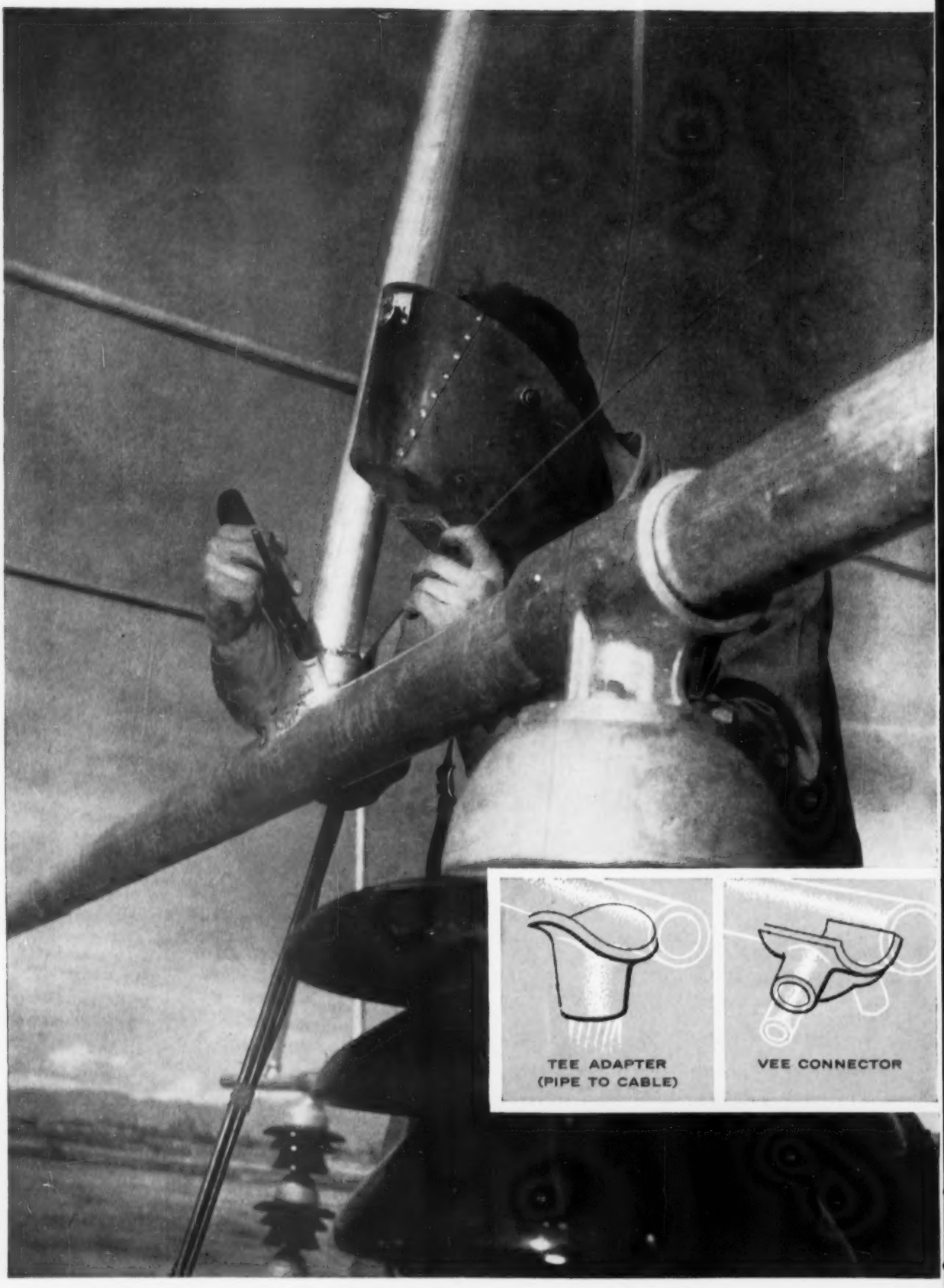
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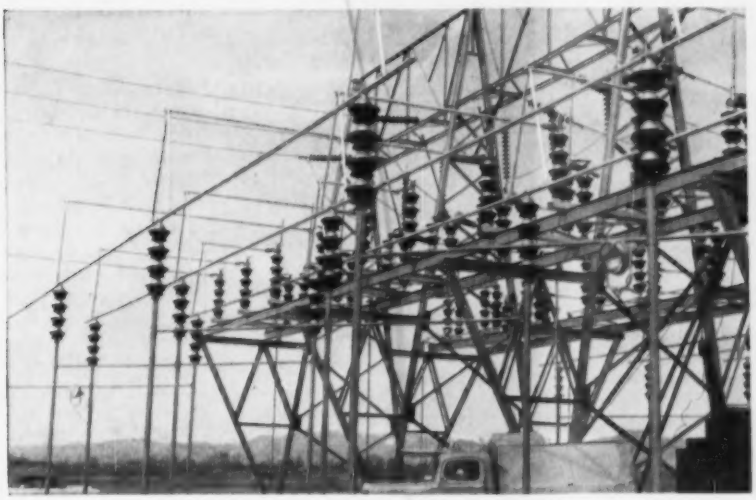
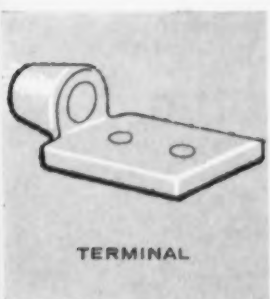
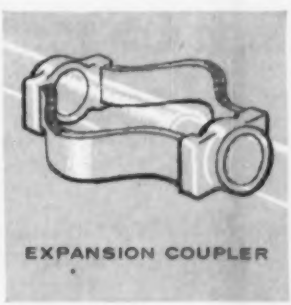


▲ Tubular bus and standard welded fittings in this substation provided savings in installed cost as well as a stronger and better looking bus assembly.



TERMINAL



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Ever since Alcoa introduced welded aluminum bus construction over 10 years ago, the electrical industry has been realizing ever-increasing savings in those installations where many joints, taps and supports are required.

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THIS MONTH'S NEWS

Oregon Water Board Wants Project Delay

The Oregon water resources board will ask the Federal Power Commission to defer action on application of the Pacific Northwest Power Co. for licenses to build Mountain Sheep and Pleasant Valley Dams on the Snake River while the board makes a $50,000 study of the middle Snake.

The water resources board voted for such action contingent upon provision by the state emergency board of the $50,000 required. But with Governor Robert D. Holmes pressing the action, likelihood was strong that the emergency board will provide the money.

The water resources board would ask the FPC to hold up action on PNP's application until March 31, 1959.

Fred Merryfield, Corvallis consulting engineer and chairman of the board's program committee, said the proposed study would be limited principally to compiling studies already made, but would be supplemented by further studies in some fields.

Application of PNP, formed by Portland General Electric, Pacific Power & Light Co., Washington Water Power Co. and Montana Power Co. – for a state license to build the $234,000,000 Mountain Sheep-Pleasant Valley project – was referred to the water resources board by the state hydroelectric commission at Governor Holmes' request.

The project, with potential capacity of 1,446,000 kw, would be part in Oregon, part in Idaho.

Hugh Smith, attorney representing PNP, opposed the board's action, declaring the proposed study would result in further delay of any kind of development.

Smith said PNP would go ahead with plans for construction of the two dams if licensed by the FPC, regardless of what an Oregon study might show or the board's decision about issuance of a state license.

The water resources board maintained also it has jurisdiction over the three middle Snake projects of the Idaho Power Co., already licensed by the FPC with one—Brownlee Dam—under construction.

Attorneys for Idaho Power argued before the board's special examiner that the state board had no authority over the FPC-licensed dam sites.

The board said it would include the Idaho Power projects in its proposed study of the middle Snake.

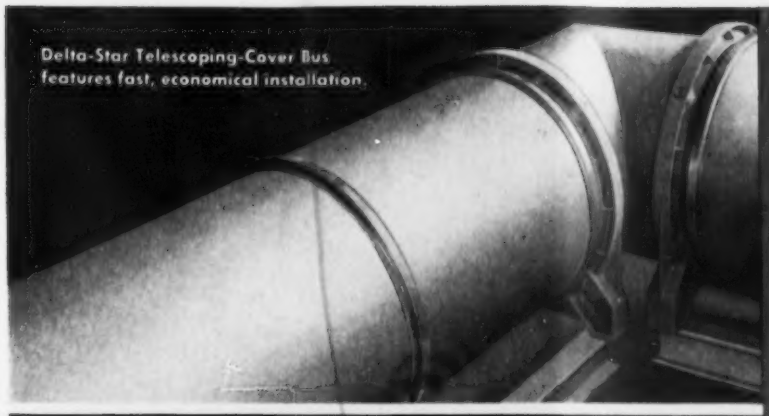
PGE's Operation Fishlife Saver

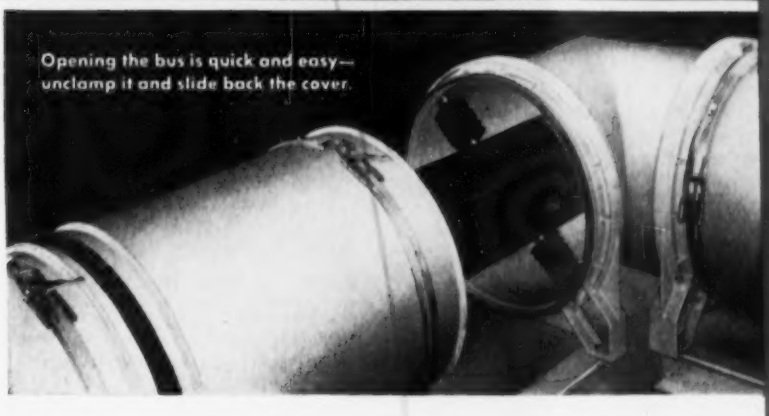
Portland General Electric Co., preparing to expand its Faraday power house on the Clackamas River, had to drain the forebay. The lives of steelhead salmon were jeopardized, so PGE employees turned fishermen for a day to move them out of the way. Under the supervision of George Eicher and Zeke Madden, PGE's aquatic biologists, the fish were netted from boats and transported in a special tank truck

New Libby Office For Pacific P&L

Pacific Power & Light Co. has started construction of a modern office and service building in Libby, Mont.

Collins Construction Co., Kalispell, is building the structure on a general contract, including mechanical and heating equipment, on a bid of $62,910. Electrical installations are under a separate contract.


Delta-Star Telescoping-Cover Bus features fast, economical installation.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Clamping ring with toggle and spring mechanism applies moisture-proof seal.

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Telescoping-cover bus sections can be opened and inspected without tools—*in just a few minutes.* A 2 ft. 6 in. opening allows ample room for inspection and cleaning.

Current-carrying ability and minimum-heating characteristics of the telescoping-cover bus proved out very well in tests and in use.

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Program at Pelton—Left, lift of 220,000 lb was required to put stator in place for No. 1 generating unit at Portland General Electric's Pelton hydroelectric project on Deschutes River in central Oregon. The $25,000,000 project will have three units, eventual capability of 120,000 kw. Right, this special tractor-trailer with 36 wheels was employed to transfer three Westinghouse transformers, each weighing 86,000 lb, from a railroad siding at Madras, Ore., over a 12-mile route to the project. The rig weighs 53,000 lb and has 130 tons capacity. It has front and rear steering like a fire department aerial ladder truck with the two cabs connected by an intercom system

Columbia Pact Change To Give New Powers

The Columbia Interstate Compact Commission will start work on a new compact draft to provide for an action agency "empowered to acquire, finance, construct, operate and administer multipurpose projects and facilities within the Columbia basin."

Preparation of the draft—14th since the commission started work in 1950—was authorized at a meeting of the commission in Reno.

A special study committee appointed at a meeting in Spokane in June reported that "there appear to be no legal obstacles to the development of an interstate compact containing action provisions." Consideration of an action agency was proposed by Washington and Oregon delegations.

Ratification by legislatures of Oregon, Washington, Idaho and Montana and approval by Congress are required to make the compact effective. Nevada, Wyoming and Utah are the other states affected.

Steam Geyser Erupts At Big Geysers Project

At Big Geysers, Calif., site of a projected geothermal power development, drilling crews are working to bring under control a geyser that is hurling rocks and ash 200 ft into the air.

Pressures built up in a well escaped—apparently via a natural steam vent—and blew out a crater in the hill about 125 ft from the drilling rig, according to Dan A. McMillan Jr, president of Thermal Power Co., the San Francisco firm that is developing the steam resources at Big Geysers.

According to McMillan the 10 wells at the site—up to 1,130 ft deep—can produce enough steam to generate about 25,000 kw. Pacific Gas and Electric Co., to whom McMillan hopes to sell the power, has said Thermal Power would have to build a 12,500-kw plant to justify construction of a transmission line.

Project of Benton PUD Gets More PUD Backing

A proposal by the Benton County Public Utility District to build a $150,000,000 hydroelectric project on the Columbia River about 8 miles north of Richland, Wash., has received the backing of the Franklin County PUD.

Benton County PUD, in its proposal to build the dam several weeks ago, had invited 16 other members of the Washington state public power supply system to join in asking for a preliminary permit from the Federal Power Commission. Owen Hurd, Benton County PUD manager and president of the American Public Power Assn., said he has notified the FPC of intent to file for the permit.

Meanwhile, Franklin County PUD Commissioner Glen Walkley said he hoped other public power agencies in the state would back the plan.

Atomic Power in Decade Forecast by Chadwick

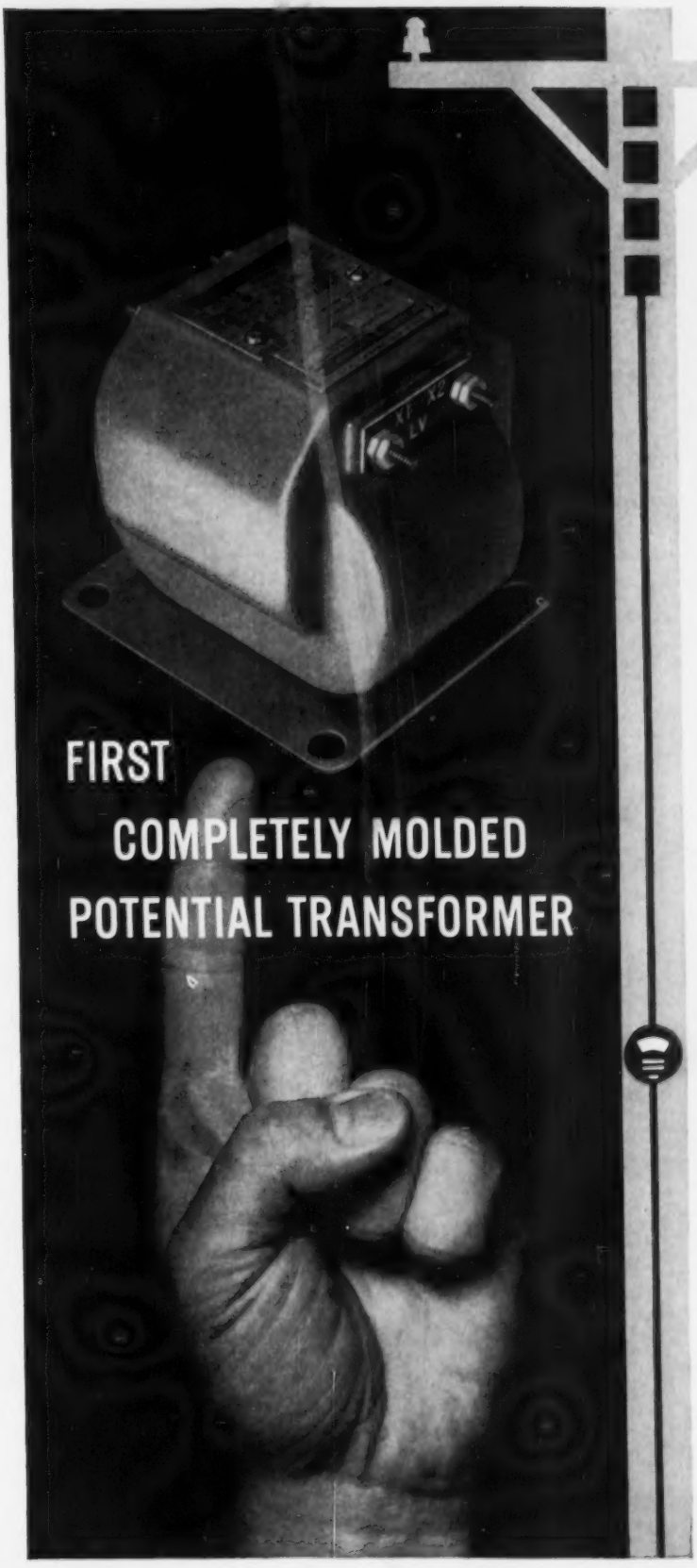
Atomically produced electricity may approach the cost of conventional power as early as 1967, it was predicted today by W. L. Chadwick, vice-president of Southern California Edison Co., which now is utilizing atomic heat in an experimental electric generating plant at Santa Susana. The reactor was built for the Atomic Energy Commission by Atomics International, a division of North American Aviation Inc.

"However, it will probably be 15 to 20 years before atomic power will produce a significant amount of the nation's electrical energy," Chadwick told Edison employees at a company meeting called to acquaint them with their role in the coming atomic age.

"A piece of uranium a little larger than a golf ball can generate as much electrical energy as 2½ million gallons of fuel oil," Chadwick declared. "This is the amount that would be required by the Edison company for a single day's operation."

Chadwick said Edison's experimental plant at Santa Susana, and the nuclear reactor to which it is attached, are "pilot sized only—a feature we like, since it avoids the risk of quick obsolescence, while new processes are being tried out.

"We also like its relatively high temperature, which permits using more of the efficiency of present conventional steam stations than those utilized in any other reactor built to date," Chadwick said.



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Designed for indoor/outdoor use, the new Westinghouse Type EMP potential transformer resists the effects of weather, as well as the industrial hazards of acids and alkali fumes. This makes it the ideal companion to use with the molded Types EMO and EMR current transformers.

The Type EMP has a thermal capacity of 150 VA and an accuracy of 0.3 at W burden. It will operate with 0.3 accuracy on practically all single meter installations and will handle multimeter installations with the same accuracy, providing the overall burden does not exceed 12.5 VA at 10% P.F.

The Type EMP is the FIRST completely molded potential transformer. Its unique construction results in such outstanding performance features as:

Longer life — Utilizing a polyester elastomer insulating material — a product of Westinghouse research — combined with corrosion-resistant metalware (baseplate and terminal studs) makes the EMP ideal for indoor/outdoor use. This resilient plastic covering is virtually shatter and chip-proof.

Lighter, Smaller. Polyester molding results in a smaller unit, with a total weight of only nine pounds.

Unequaled dielectric stability. The polyester insulating material will not break down even under severe dielectric stresses. The EMP has an impulse test level of 10-kv.

The new Type EMP potential transformer is available in 240-120, 480-120 and 600-120 volt ratings. For further information, call your Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-70824

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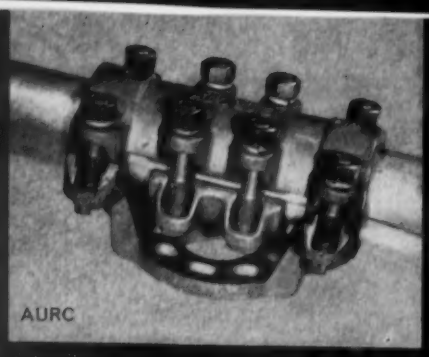
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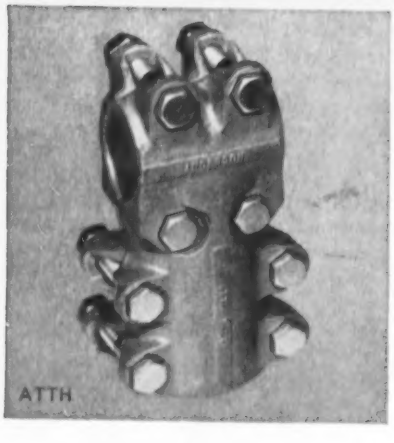
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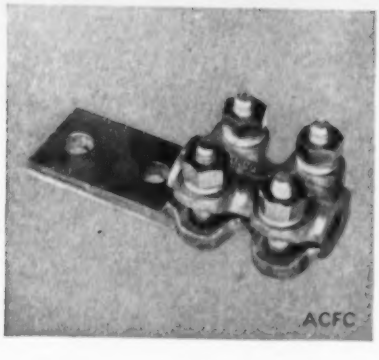
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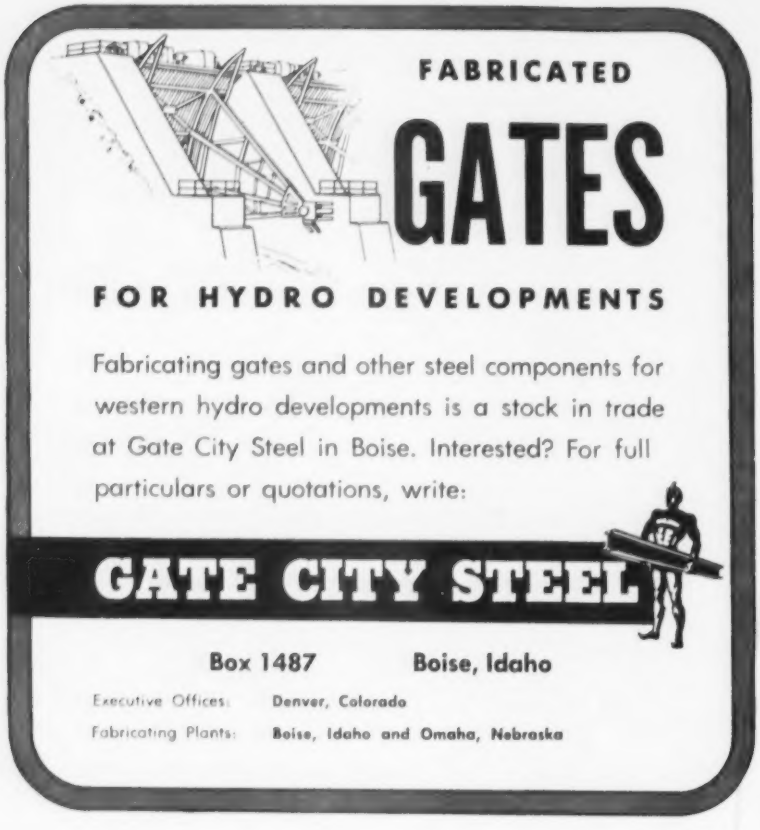
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Five Firms Get Bid On Rocky Reach Final

A joint venture of five firms, headed by the L. E. Dixon Co. of San Gabriel, Calif., will get the general contract for final stage construction of Rocky Reach Dam on the Columbia River, the Chelan County PUD has announced. Accepting the recommendation of its engineers, The Stone & Webster Engineering of Boston, Mass., the PUD commission adopted a resolution recognizing the group's bid of $52,413,078 as the best offer.

The resolution declares it is the intent of the PUD to accept the proposal of the joint venture, known as Rocky Reach Dam Builders, and enter into a contract for the work when adequate funds are available from the sale of the PUD's Rocky Reach revenue bonds.

The issue is expected to be for about $260,000,000, in addition to a $23,100,000 issue sold last year. The interest rate cannot exceed 6%, under a state law applying to the project.

Funds for Bonneville Include Grid Additions

Fiscal year appropriations of $30,668,000 for Bonneville Power Administration include $22,038,000 for continuing construction programs.

Major grid additions scheduled provide transmission facilities for 2,330,000 kilowatts of new peaking capacity, representing generator installations on the U. S. Columbia River system and nonfederal plants where wheeling arrangements are being undertaken.

Principal additions will transmit power from Chief Joseph, The Dalles, Roza and Cougar plants to regional load centers and provide facilities for the contemplated wheeling of nonfederal power from Pelton, Mayfield, Priest Rapids and Rocky Reach plants.

Rate Raise Sought By Montana Power

Montana Power Co. has asked the State Public Service Commission to permit it to increase electrical rates by 12 to 19%. It was the first such request by the 45-year-old company.

Company officials said that the proposed increases in residential, commercial, industrial, housing authorities and street-lighting project rates would net an additional $1,800,000 in 1958.

RELIGHTING PLAN for Hendersonville, N. C.'s Main Street is reviewed in light of results. Left to right are Duke Power Company local manager J. M. Gaines; General Electric illuminating engineer R. M. Swetland; and Mayor A. V. Edwards.

Start-to-finish engineering help is part of General Electric's street lighting "package"

Initial survey, preliminary application investigation, action recommendation, complete Illuminating Engineering Report for your staff or consultants . . . any or all of these services are included in the engineering aid "package" at your disposal when you place your street lighting business with General Electric!

General Electric has experienced outdoor lighting specialists in all key cities. Backing up these field specialists are more career lighting men at the Hendersonville, N. C., plant. The talents of both groups are available to you at all times.

Benefit from the years of street lighting experience General Electric has gained since Thomas Edison lighted the street in front of his home in 1879! Put this accumulated know-how to work devising the best means to bring greater visibility to your city's streets!

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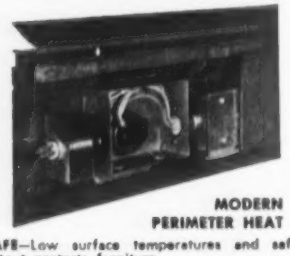
(Illustration of cut-a-way section)



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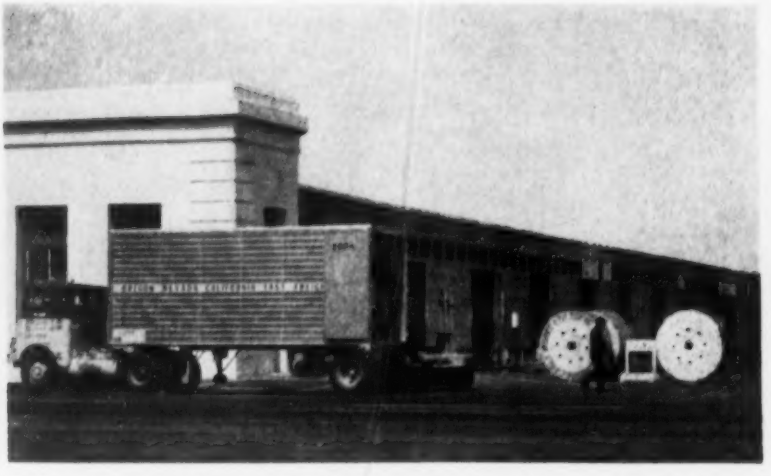

Evidence of another Japanese invasion—of a more peaceful nature—was to be seen on San Francisco's Embarcadero as many reels of Japanese manufactured submarine cable arrived for Pacific Telephone Co. Two manufacturers were represented

South Bay Construction Will Be Started Soon

Construction start for the first unit of San Diego Gas & Electric Co.'s new South Bay power plant has now been set for "late this year," according to H. A. Noble, vice-president, operation.

The turbogenerator will have a capability of 130,000 kw and is scheduled to be placed in operation in July 1960. Cost of the first generating unit and development of the site will be about $23,000,000.

First unit, as well as most of the seven additional units which may eventually comprise the plant, will be built on acreage within the city of Chula Vista. Other plant facilities on the site will be on acreage within the city of San Diego and in the unincorporated area of San Diego County.

Unit No. 3 of the Encina power plant near Carlsbad will be ready for operation in July 1958, increasing the total system generating capability from 566,000 kw to 672,000.

Escalator Clause In Los Angeles Rate Hike

The Los Angeles City Council has voted to raise electric power rates of the city's municipal utility an average of 12c a month to the private householder and from 3 to 10 % to large power consumers, with an escalator clause tying rates to fuel costs.

The rate hike will boost municipal utility power revenues by approximately $6,000,000 a year.

The council passed two ordinances affecting both Los Angeles and the Owens River Valley. The escalator clause in each ordinance will permit the Department of Water & Power to make further periodic adjustments as oil and gas prices fluctuate.

The department contended that spiraling fuel oil and natural gas prices had effected an uncontrollable rise in production costs of the steam-electric plants that supply 75% of the city's power.

Under terms of the escalator provisions, Water & Power will adjust rates every two months, depending upon the degree to which changes in fuel costs affect the base rate of three mills per kilowatt-hour of electric energy sold.

In seeking the rate increase, Water & Power officials pointed out that fuel costs had zoomed from $16,000,000 in the 1955-56 fiscal year to an estimated $26,000,000 during the current fiscal year.

It was contended that a further drop in revenues would hurt the sale of revenue bonds used to meet capital expenditures on a program geared to Los Angeles' rapid growth.

• **The Douglas County PUD** of East Wenatchee, Wash., has filed with the FPC an application for permission to build a hydroelectric dam on the Columbia River at Wells, 45 miles above Wenatchee. Preliminary studies and engineering for the $116,000,000 project have been completed under a preliminary permit from the FPC, said William Nordeen, manager. Construction would begin in one year.

Theory Plus Practice

Lord Kelvin:

First, the pure theory—applied without delay to practical inventions: this was the tenor of Lord Kelvin's outstanding work.

Following his "Law of Squares" in 1853 he perfected the curb transmitter, which overcame the retardation of signals in long-distance cables.

From Lord Kelvin's theory plus practice, more than a century ago, stem today's advances in communications.

For over a century, Kerite theory and practice has proved that Kerite is the most lasting cable known. More than three generations of Kerite craftsmen have given of their inherited skill to assure the long life and service of Kerite Cable. The Kerite Cable Company takes pride in the fact that their product is chosen by buyers of integrity to safeguard installations around the world.

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Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco; 3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston; 4101 San Jacinto, Houston 4, Texas; 1010 Euclid Avenue, Cleveland 17, Ohio; 29 West Lancaster Avenue, Ardmore, Pa.

NOTES ON THE TRADE

These officers of the Rocky Mountain Electrical Manufacturers Representatives Club Inc. are planning an electrical show scheduled for next spring in Denver. Left to right: Clyde P. Elliott, immediate past president; Kenneth B. Schumann, secretary; Glenn B. Gaer, president; Terry Tilley, vice-president; and George Kaub treasurer

• **Appleton Electric Co.** has announced plans to open a manufacturing facility at Maywood, Calif., which is in Los Angeles County. The new building, besides being used for manufacturing Appleton's various electrical devices, will serve as the warehouse for West Coast supplies.

• **Stromberg-Carlson** is starting construction on a new engineering department building at San Diego. The new building will increase the size of the main San Diego plant by 50%, and will house both engineering and manufacturing facilities.

• **An error** in a recent issue of ELECTRICAL WEST had Cavalier Corp. products being handled by the Jack Payne Co. in the Los Angeles area. Actually, Jim Shirreffs Co. has the line in Los Angeles and vicinity and Jack Payne Co. in San Diego, Arizona and Imperial Valley.

• **Yale & Towne** Mfg. Co. has announced the establishment of a major industrial lift truck replacement parts depot in the company's new San Leandro, Calif., manufacturing plant. The depot will supply parts to maintain the levels of inventories kept by Yale representatives and branches in the 11 Western states and the two Western provinces of Canada.

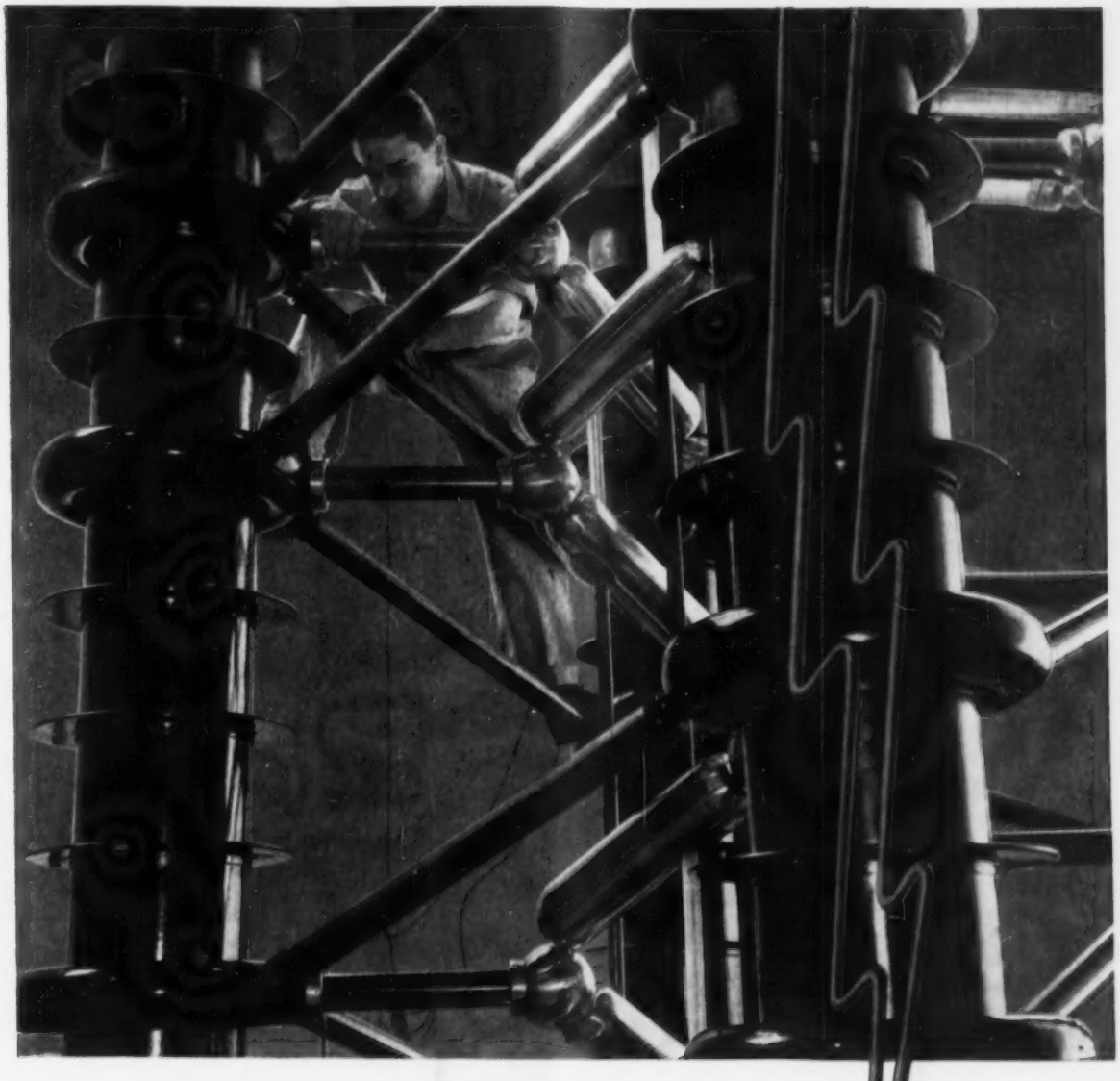
• **Foster Wheeler** Corp. has opened an office in the Vance Building, 3rd and Union, Seattle. The new office will be under the supervision of **S. P. Trewin,** district sales manager, and will serve the States of Idaho, Montana, Oregon and Washington.

Mackley

• **O. H. Mackley** has been appointed vice-president and general manager of Hycon Electronics Inc. by Trevor Gardner, president and chairman of Hycon Mfg. Co. in Pasadena. Hycon Electronics Inc., a wholly owned subsidiary, designs and manufactures commercial and industrial test equipment.

• **C. J. Holzmueller,** for more than 50 years a source of equipment and services in connection with all types of theatrical presentations and lighting effects, has recently added a theater engineering division with consultation services in all phases of theater and auditorium stage lighting, rigging, drapery and associated requirements. The new division will be headed by **James Jewell.**

A giant 8,000-hp electric motor, largest ever made in the West, is under construction at the Westinghouse Sunnyvale plant. The motor, weighing nearly 94,000 lb, will be installed on a $3,500,000 "cutter-type" dredge being built for the Utah Construction Co. in the Alameda, Calif., yards of Pacific Coast Engineering Co.



Simplex Wire & Cable Company's new 1,400,000 volt impulse generator — the first of its kind to be installed in North America — represents just one aspect of research at Simplex. Simplex scientists and engineers originated the process of vulcanizing portable rubber cords and cables in a lead mold. Simplex developed the first heavy-duty portable electrical cable — Simplex TIREX. The first truly moisture-resistant rubber insulation was the outcome of a commercially acceptable method of deproteinization developed by Simplex. Simplex designed the first interlocked armored cable for underground service — Simplex CONDEX. And now — Simplex C-L-X — the portable, corrugated metallic duct WITH SEALED-IN CABLE. **SIMPLEX WIRE & CABLE CO.,** Cambridge, Massachusetts and Newington, New Hampshire.

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NEWS ABOUT PEOPLE

PP&L Makes Changes In Wyoming District

Don Harris, manager of the Worland, Wyo., district for Pacific Power & Light Co., has been transferred to a newly created position as Casper district manager.

It will relieve Veryl Hoover, Wyoming division manager, of his local duties as Casper area district manager, freeing him for closer supervision of the entire division. Hoover had been doubling as Casper district manager in addition to being division chief.

A. A. Peters, Lovell area manager since 1940, replaced Harris at Worland and Howard Lusch, Cody manager the past 11 years, was named Lovell district manager. Roy White of Laramie, a 26-year veteran with PP&L, was promoted to Cody area manager.

Personnel Changes Made By Maydwell & Hartzell

Listed below are changes and additions in the Northwest sales force of Maydwell & Hartzell:

William L. Bright, formerly Portland manager, changed to Northwest regional manager in charge of sales and service in Oregon, Washington, Idaho and Montana. Bright has been with M&H since 1949.

Hugh A. Dewar, formerly sales engineer in the Portland district, transferred to Seattle as Washington district manager.

Aubrey A. Van Loo, new sales engineer in the Portland district, replaces Mr. Dewar, handling southern and southwest Oregon territory. Van Loo is a graduate of Oregon College and had seen service with the California Oregon Power Co. before joining M&H.

Dave A. Brooks joined M&H early in 1957 and was assigned to the Washington territory headquartering in Spokane and covering eastern Washington, northern Idaho and western Montana. Brooks is a graduate of the University of Washington.

Charles B. Ellis is another new man in the Portland district where he formerly worked for Portland General Electric Co. He is well known by people in the electrical field and has many outside activities —such as Navy Reserve and being active in the affairs of the city of St. Helens where he resides.

• **Thomas E. Black** is now manager of the Benton County PUD at Kennewick, Wash. Black has been with the Bonneville Power Administration since 1946, most recently serving as area manager at Portland, Ore. He previously was Walla Walla district engineer and Vancouver district manager for the BPA.

• **Portland General Electric** Co. President Frank M. Warren Jr. and Vice-president Hilbert S. Johnson became members of PGE's 20-year club at the club's 34th annual banquet.

• **The Hollywood Wholesale Electric** Co. announces the appointment of Edward A. Hall as general sales manager. Hall succeeeds Jack E. Bisset, who has been named assistant general manager, with general supervision of company operations.

• **The superintendent** of distribution for the Victor-Cripple Creek District of Southern Colorado Power Co., **Art Feller,** retired after 40 years service. He began as a lineman.

• **Alan Jones** is the new manager of the McMinnville, Ore., water and light department. His promotion followed naming of Milton H. McGuire, manager for 37 years, to a new position of engineer consultant. McGuire, an organizer of the Northwest Public Power Assn., was honored at a testimonial banquet July 9.

• **J. E. "Jack" Barkle Jr.** has been appointed assistant chief electrical engineer of the Bechtel Corp. He will work under Karl Bausch in Bechtel's San Francisco headquarters. For the past 18 months Barkle has been in the logging supply business at Arcata, Calif. Prior to that time, he was manager of utility system engineering for Westinghouse Electric Corp. at East Pittsburgh. He is a member of AIEE and the author of numerous papers and articles on utility engineering practices and problems.

• **Edgar L. Kanouse** will succeed Arthur Williams as engineer of design and construction for the Los Angeles Department of Water & Power. His assistant will be **Oscar L. Sidenfaden** who will continue to head up the administrative and engineering services section of the design and construction division in addition to his new duties.

• **Louis N. Stone,** professor of electrical engineering, has been appointed head of the electrical engineering department at Oregon State College. He succeeds H. G. Barnett.

Oil beats Sludge to the punch

DO MAINTENANCE CHECKS show equipment deterioration resulting from sludge build-up or acid formation? Then now is the time to switch to SHELL DIALA OIL AX—the insulating oil which *fights oxidation*, main cause of sludge and acid.

The secret of Diala's knockout power is a specially-developed oxidation-inhibitor, which is incorporated in an oil *specifically* refined for inhibiting. This combination is so effective, users report Shell Diala AX is still sludge-free *years after ordinary oils fail.* As a result, you get from three to five times the usual service life on your electrical equipment when you use this Shell insulating oil. *Plus* the advantage of eliminating the need for costly maintenance and frequent oil purification.

Chances are Shell Diala Oil AX—first of the inhibited oils—is the answer to your problem. It is one of many fine products developed by Shell Research, a 1500-man team strong on experience in your industry. Why not put that experience to work this week?

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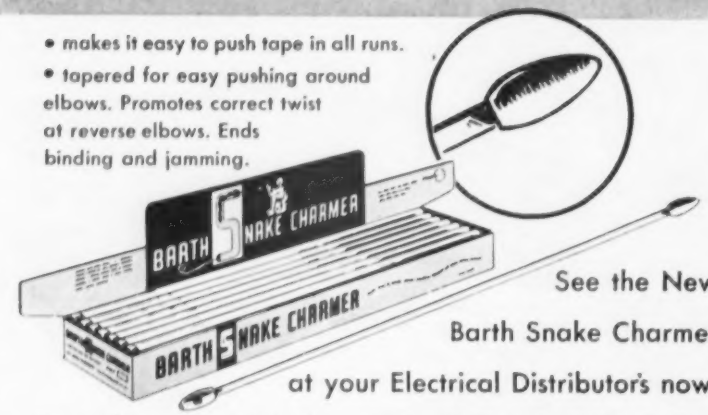
EASIEST TO USE FISH TAPE LEADER ON THE MARKET!



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Everybody benefits when everybody gives

the UNITED way

- **Franklin S. Brown,** chief of the engineering division of the North Pacific Division, Corps of Engineers, has become the first Army Engineers' employee in the field service to receive a civil service rating of GS-16. With the North Pacific Division since March 1952, Brown came to division headquarters from the Seattle District where he was chief of the engineering division and supervised the design of Chief Joseph Dam on the Columbia River, Albeni Falls Dam on the Pend Oreille River and a wide variety of military construction.

- **Arthur L. Williams,** a veteran of 35 years service with the Los Angeles Department of Water and Power, has been appointed to the position of assistant chief electrical engineer. The appointment fills the vacancy created by the retirement last month of James D. Laughlin, who had served with the department for more than 37 years.

- **Art Gredler** has been appointed service manager for the Fastening Division of Omark Industries Inc., in Portland. Gredler will establish and head a newly created service department whose function will be to analyze complaints, establish their causes and correct them.

- **Ben Little,** manager of Consumers Power Inc., electrical cooperative in the Corvallis, Ore., area, has been appointed a member of the Oregon water resources board by Governor Robert D. Holmes. Also appointed to the board was **La Selle Coles,** Prineville, manager of the Ochoco Irrigation District.

- **Thomas E. Black,** Portland, has been named manager of the Benton County Public Utility District, succeeding Owen Hurd. The appointment was effective Oct. 1. Hurd resigned his post to become general manager of the Washington Public Power Supply System.

- **Luther C. McIver,** purchasing agent for Puget Sound Power & Light Co. in Seattle, has been named co-chairman of Big Gifts Division in the Overlake Memorial Hospital building fund campaign, to be located on the east side of Lake Washington.

- **Per Albert Person,** steam superintendent of Pacific Gas and Electric Co's San Francisco division, retired June 30. Person will be succeeded as steam superintendent by Neldon E. Rhodes, presently supervisor of operation in the division steam department.

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For further information on the improved "DX" cutout, contact your Westinghouse Sales Engineer, or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60936

YOU CAN BE SURE...IF IT'S Westinghouse

• **Clyde H. Spencer** is leaving his post as director of the U. S. Bureau of Reclamation's Sacramento Region II to take a job with the Sacramento Municipal Utility District. He will serve as project engineer of SMUD's $85,000,000 Upper American River power and water project, scheduled for ground breaking Sept. 28. His bureau job has been taken over by **Bernard P. Bellport,** a bureau engineer for 20 years. Bellport has served as construction engineer on several California projects, including Monticello Dam and various features of the Central Valley Project.

• **Harriet Christie,** home service director for Black Hills Power & Light Co., was appointed to the Home Service Committee of the Edison Electric Institute.

Hurd

• **Owen W. Hurd,** manager of the Benton County PUD at Kennewick, Wash., since 1948, has been appointed managing director of the Washington Public Power System, formed earlier this year by 17 PUDs to develop electric power generating and transmission facilities. He will open offices in the Tri-Cities area of Pasco-Kennewick-Richland.

Before taking the PUD post, Hurd worked for 14 years as an electrical engineer for the Northwestern Electric Co. at Portland, Ore., and from 1941 to 1948 was with the Bonneville Power Administration at Spokane, Wash.

Hurd recently proposed a new dam across the Columbia River 8 miles upstream from Richland, to be known as Ben Franklin Dam. The Washington Public Power System is requesting from the FPC a preliminary permit to study the 585,000-kw project.

Barnett

• **Howard G. Barnett,** former head of the electrical engineering department at Oregon State College, has joined the engineering staff of Portland General Electric Co. as distribution planning engineer. He was with Westinghouse Electric Corp. for 18 years and is one of the authors of "Electrical Transmission and Distribution Reference Book." Barnett is a fellow of the AIEE.

• **R. Victor Bauer,** formerly market research director for Pacific Power & Light Co. in Portland, is PP&L's new industrial development engineer in the utility's Wyoming service area with headquarters at Casper. In his new assignment Bauer will cooperate with industry, state and civic resource development programs in the Wyoming area.

• **James N. Landis** has been nominated president of The American Society of Mechanical Engineers. He will be installed in office, after a letter ballot of the membership, during the ASME annual meeting to be held in New York in December, to serve for a term of one year.

Deaths

• **Frank R. Jamison,** 81, who retired in July 1954, as director of advertising and public relations for Public Service Co. of Colorado, died Aug. 31 in Denver. Born in Norwich, Ohio, April 24, 1876, Jamison moved to Canadian, Tex., as a youth for his health. He worked there as a cowboy with the then unknown Will Rogers. Later he went to work for the *Canadian Record,* a weekly newspaper, which he bought in the early 1900s. He sold it in 1919 and moved to Amarillo, Tex. After working on a daily newspaper there, Jamison went to work for a subsidiary of Cities Service Co. at Amarillo. He moved to Denver in 1923 and a year later was appointed public relations director for Public Service Co. of Colorado. He was active in many civic groups and in the Boy Scouts, which presented him the Silver Beaver award, Scouting's highest honorary award.

• **Herbert C. Poole,** 72, founder and president of the Poole Electric Co., Seattle, died Aug. 26 after a brief illness. He founded the business in 1915 after attending Stanford University, and was active in its management until his illness.

• **Edward H. Eardley,** 78, died at Salt Lake City, in his 60th year as an electrical contractor. He was a former president, Utah Manufacturers Assn., director of National Electrical Contractors Assn. and president of the Utah Electrical Contractors Assn.

• **Raymond H. Fisher,** owner of the San Francisco wholesale electrical supply firm bearing his name, died Sept. 8 at the age of 49. He had a heart attack a week earlier. He had operated his own company for the last 10 years. His widow, Alva A. Fisher, has been elected president of the firm.

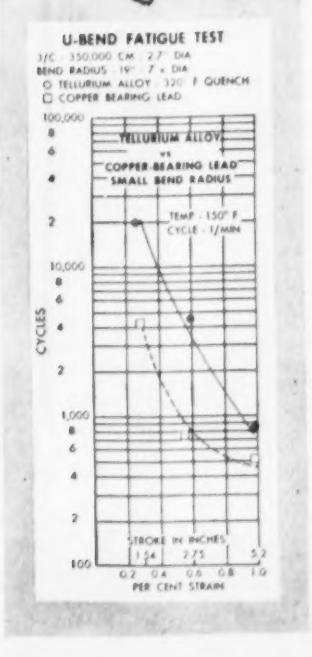
• **William F. Freitag,** 48, district office manager of Pacific Power & Light Co. at Yakima, Wash., died recently of a heart attack. He had been with the company 30 years, joining the firm at Hood River, Ore., and later serving at offices in Dayton and Pomeroy, Wash., and Pendleton, Ore., before going to Yakima.

• **George Wilson,** 58, Nucla, Colo., president of the Colorado Rural Electric Assn., died of a heart ailment in mid-July. He was a native of Montrose, Colo., and a graduate of the University of Colorado. He had served as a state senator since January 1955.

• **Gordon Ross Johnson,** 66, retired civil engineer, died at his home in Vancouver, B. C., June 22. Long an employee of Pacific Power & Light, he was a member of the American Society of Civil Engineers.

• **John A. Koontz,** retired chief of the division of hydroelectric and transmission engineering of the Pacific Gas and Electric Co., died recently. He had retired from active service after 38 years with PG and E and Great Western Power Co. In

ROEBLING'S TELLURIUM LEAD ALLOY SHEATH LASTS 4½ TIMES AS LONG!



It's been proved in laboratory tests—the Tellurium Lead Alloy Sheath on Roebling Paper Power Cable has *4½ times more bending life* than copper bearing lead sheath! What's more, tests (and experience) prove this sheath has outstanding stability under heat... unusual resistance to age hardening... negligible creep rate at 200 psi, 150°F

The paper power cable inside matches the extra quality of the sheath. And that's the whole story—there's simply no better cable buy, when the cable you use has to last, then last some more!

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STATEMENT REQUIRED BY THE ACT OF AUG. 24, 1912, AS AMENDED BY THE ACTS of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of Electrical West, published monthly (13th issue published in November as Buyers' Guide and Directory) at Portland, Oregon, for October,1957

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Published by McGraw-Hill Company of California.....68 Post St., San Francisco 4, Calif. Editor, C. W. Leihy.....68 Post St., San Francisco 4, Calif. Managing Editor .....None Business Manager, T. H. Carmody, Jr.....68 Post St., San Francisco 4, Calif.

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T. H. CARMODY, JR., Business Manager.

Sworn to and subscribed before me this 11th day of September, 1957.
[SEAL] MAXINE O'BRIEN

Notary Public in and for the City and County of San Francisco, California.
(My commission expires Dec. 23, 1957)

charge of electrical and mechanical design of all major building projects, Mr. Koontz had worked on such projects as Caribou and Big Bend on the Feather River and Station P in San Francisco. He was a native of Aztec, N. M., and attended schools in Colorado Springs and Denver. He was a graduate of what is now the California Institute of Technology, and also of Stanford University.

• **Clyde F. Holcomb,** district manager in Seattle for Thomas A. Edison Industries, Storage Battery Division, died of a heart attack in his Seattle home at the age of 56. He was born in Seattle, was a member of the Thomas A. Edison Industries Old-Timers Club, and prominent in yachting affairs in the Puget Sound area. He is survived by his wife and two sons.

• **J. Ryan Gaul,** 73, manager of the Butte Division of the Montana Power Co. at the time of his retirement in September 1942, died July 3.

• **William C. Walsh** succumbed July 15 to a lengthy illness. He was Western region sales manager for General Electric Co.'s replacement tube sales, electronics components division. Born in San Francisco in 1910, Mr. Walsh received a bachelor's degree in electrical engineering from the University of California.

• **Bert W. Stiles,** 71, of Denver, president of Stiles Electrical Service Inc., died at Denver July 7. He founded his firm in 1918 and became prominent in the National Electrical Contractors Assn. and the Denver Chamber of Commerce. He was a graduate of Colorado College and was a veteran of World War I.

• **David Dwight Sturgeon,** 78, credited with originating outdoor Christmas tree lighting in Denver, died Aug. 1 at a Denver hospital. He was chairman of the board of Sturgeon Electric Co. Inc., which he founded in 1912. Sturgeon colored a string of light bulbs by hand and strung them on a snow-covered evergreen tree during the 1912 Christmas season. He arranged the display outside the window of a room where his 4-year-old son was ill with pneumonia. In succeeding holiday seasons Sturgeon decorated outdoor trees for friends and the practice soon became city-wide. He was a charter member of the Rocky Mountain Chapter of the National Electrical Contractors Assn., incorported in 1945. He had served on the board of directors of the association since then.

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- The phase SPANTAP, above, is installed on the run by tightening a single bolt! The insulating cover halves snap together... securely held by humpback cotter pins. Knockouts in the insulating cover permit insertion of taps without removing this cover!
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- The service drop neutral is wrapped around the SPANTAP V-groove which produces a wedge-locked grip on the conductor. As stresses increase, the simple connection grows tighter!
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- Write for complete technical specifications. Burndy, Norwalk, Connect., Scarboro, Canada.

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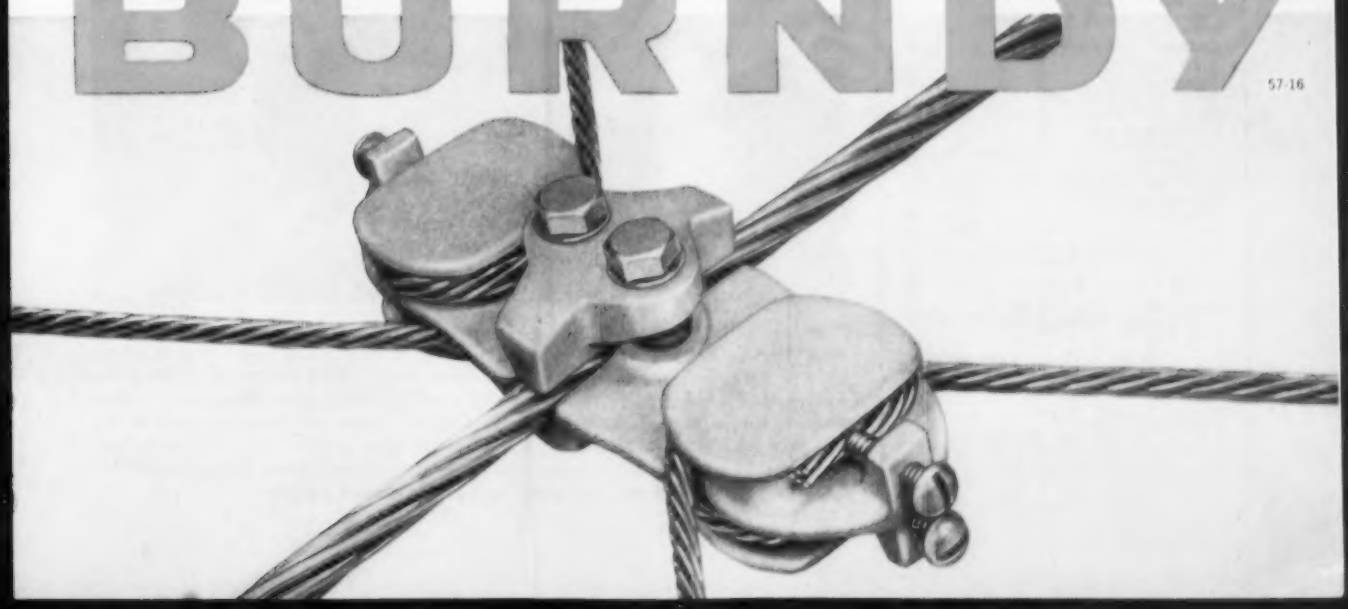

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PROFILES

These men were instrumental in bringing to the East Bay division of Pacific Gas and Electric Co. a one-day forum on residential electrical wiring. The highly informative capsule course was based on the Residential Wiring Handbook approved by the Industry Committee on Interior Wiring Design. Seated, from left, are T. J. Ryan, business agent of IBEW Local 302; Clyde Narvez, city of Richmond electrical inspector; A. G. Mainini, president of Local 302; Jack Slater, Thompson Electric Co., and Jelly Watson, El Cerrito Electric Co. Standing are: Warren Jackman, assistant business agent of Local 302; Leo Kass, PG and E; W. J. Meuser, PG and E; and Joe Krivanek, Northern California Chapter, National Electrical Contractors Assn.

Honolulu had its second Parade of Homes last month, with emphasis on wiring. First Parade builder to receive his "Modern Wiring Certificate" was Kenneth Shioi, whose tri-level home bears the Live Better Electrically sign. Here the presentation is being made to Shioi (left) by C. H. McAllister, chairman, Certified Modern Home Wiring Committee, and Virgil A. Nahl of Hawaiian Electric Co. E. Tokunaga of Rite-Way Electric Co. holds the sign. The 1957 Parade, Sept. 21-29, was sponsored by the same group that planned the first Parade last year: PCEA, the Home Builders Assn. of Hawaii and the Honolulu Advertiser

Don't you get the feeling this is a modern, efficient organization?
Luminous ceilings would do the same for your company.

What a beautiful way to increase office efficiency

It's a matter of record that a bright and pleasant seeing-environment boosts production. Whether in office or factory — when you do away with gloom and glare, you reduce errors and accidents.

The even light of this luminous ceiling is easy on hard-working eyes . . . produces a handsome "open sky" appearance. The proud owners of this ceiling-of-light — Lenkurt Electric Co., San Carlos, Calif.— say it has effectively reduced eye fatigue and improved working conditions. The working environment is vastly better, too . . . roof members, overhead wiring and plumbing are now out of sight.

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Northern California Electrical Bureau

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Wale

A wale is not a sea-going mammal with the "H" knocked out of it. Nor is it a baby's cry. Wale is a verb, meaning to choose or select for oneself.

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Take the electric industry's national "Live Better . . . Electrically" and "Full HOUSEPOWER" programs. If you're featuring one or both of these successful campaigns in your advertising and sales promotion you really waled wisely. If you're in the small minority who haven't it's still not too late to change your mind. Just stop wailing and start waling a winner!

For complete details on either campaign, as well as other PCEA activities, drop in or write to either of our offices.

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